

Research and Development Activities

Fiscal 2003



AMERICAN PRINTING HOUSE
FOR THE BLIND, INC.

HV42
.Am35
D441
2003

American Printing House For The Blind

Research & Development Activities

Fiscal 2003

Mission

Our mission is to promote the independence of blind and visually impaired persons by providing specialized materials, products, and services needed for education and life.

Introduction	1
Advisory Committees	3
Department of Educational and Technical Research Staff	5
Agencies Participating in Research	6
Consultants	7
Field Evaluators	11
<u>Accessible Tests Department Activities in FY 2003</u> [formerly Test Central]	15
Tests and Assessments (11) w/5 people	27
Functional Assessment/Curriculum	29
Kaufman Functional Academic Skills Test (K-FAST)	30
Large Print/Braille Toss Away Protractor	31
Large Print/Braille Toss Away Ruler	32
EP National Literary Braille Competency Test Revised	33
Practice Materials/Test Preparation Materials	35
Psychoeducational Assessment of Students Who Are Visually Impaired or Blind: Infancy Through High School, 3 rd Edition	35
Psychoeducational Assessment of Visually Impaired Persons: Video Update	37
Test Access: Guidelines for Computer Administered Testing	38
Test and Assessment Needs	40
Woodcock Johnson III Tests of Achievement: Student Braille Edition	40
<u>Research Department Activities in FY 2003</u>	43
Adult Life (3)	45
Adult Life Needs	47
Braille Date Book	48
EZ Track Financial Record Keeper	49
Find It Object Locator	49
Label Kit	50
Money Talks	51
Nonverbal Communication Curriculum	52
Orientation and Mobility Family Book	53
Parenting Book	54
Printing Guide	55
Sewing without Sight	57
Student Electronic Mobility Aid	57

Transition Tote System, Revised	58
Art	61
Textured Paper Collection	63
Time for Art	64
Braille	65
Alphabetic Braille and Contracted (ABC) Braille Study	67
Annotated Bibliography on Hand Skills for Reading Efficiency	68
Brailleable Labels and Sheets	69
Braille Code Recognition Program	70
Braille Literacy for Older Blind Students	70
Braille Productions Study	71
Flat Stylus	72
Fun with Braille Books (formerly Braille Contraction Practice Books)	73
Patterns Library Series, Print Editions	74
Pop-A-Cell	75
Quick Pick Contractions (formerly Braille Contraction Practice)	76
Reading for Adults in Uncontracted Braille	77
Revision of Patterns: The Primary Braille Reading Program	78
Early Childhood	81
Alphabet Scramble	83
Moving Ahead: Storybooks for K-2	84
Revision of the Handbook, On the Way to Literacy: Early Experiences for Visually Impaired Children	86
Rolling Right Along Series (Book 1: Rolling Into Place)	88
Rolling Right Along Construction Kit	89
Educational Games	91
Armadillo Army	93
Talking GlowDice (formerly Electronic Talking Dice)	94
WebChase	96
Low Vision	99
Bright Line Reading Aid	101
College Ruled Bold Line Spiral Notebook	101
ENVISION I: Vision Enhancement Program for Distance Devices	103
ENVISION II: Vision Enhancement for Near Magnification Devices	103
ISAVE 101	104

ISAVE Visual Fields/Acuity Grid	105
Large Print Atlas	105
Optimizing Reading of Continuous Text in Students with Low Vision	107
Science Skills Inventory	107
Smaller Books Larger Print	108
Tootle Tiles	110
Turbo Phonics	110
Ultimate Low Vision Lamp	111

Mathematics 113

Magnet Mate Math	115
Primary Math Units	115
Quick Pick Counting	117

Microcomputer Applications and Products 119

APH Digital Audio Component	121
APH Speech Environment	122
Book Port	125
Book Wizard	128
Math Flash	134
Money Talks	135
Monitoring Technological Developments and Educational Applications	136
Studio Recorder	139
Talking Learn Keys	143
Talking Word Puzzles	144
Talking Typer for Windows	145
Teacher's Pet	147
Word Player	150
Verbal View of Windows XP	150

Multiple Disabilities 153

Braille Rap Song	155
Cortical Visual Impairment (CVI) Projects and Needs	155
Cortical Visual Impairment (CVI) Web Site	156
Lots of Dots: Learning My ABC's	157
Multiple Disabilities Projects and Needs	158
Sensory Learning Kit	158

Physical Fitness 161

Going Places: Transition Guidelines for Creating Community-Based Athletic Activities for Students Who are Blind or Visually Impaired	163
--	-----

Portable Sound Source IV – Sport Edition.....	163
Research: A Three Year Parent-Child Physical Activity Intervention Among Families of Children with Visual Impairments.....	164
Research: An Analysis of Gait Kinetics of Visually Impaired Children During Running.....	165
Sound Ball.....	166
Science.....	167
Sense of Science: Animals.....	169
Sense of Science: Astronomy.....	170
Tactile Periodic Table of Elements.....	171
Tactile Graphics.....	173
Activity Game Book.....	175
Braille Transcriber’s Kit: US Maps.....	176
Braille Transcriber’s Kit: Math.....	177
Feel ‘n Peel Stickers II.....	177
IntelliTactiles: Pre-Braille Concepts.....	179
IntelliTactiles: USB Overlay Companions.....	181
Low-Relief Graph Sheets – .4”.....	182
Princeton-APH World Maps.....	182
Setting the Stage for Tactile Understanding (formerly Tactile Transitions).....	183
Tactile Connections: Symbols for Communication (formerly Tactile Symbol Communication System).....	185
Tactile Drawing Board.....	187
Tactile Graphics Kit Re-Design.....	188
Tactile Graphics Research.....	190
Toys.....	193
Tangle Toy Kit.....	195
Technical Research Division.....	197
Technical Research Division.....	199
Presentations and Workshops.....	219
Product Materials.....	224
Publications.....	225
New Products.....	226

Research Department Annual Report 2003

How often have we heard the statement, "On the shoulders of giants?" One year ago, those giants were honored and remembered for contributing to the vision and mission of APH.

These giants would be the first to admit that successful research and development programs require a team effort supported by a community of data providers. The APH Research Department community team is complex and far-reaching. It includes not only our Project Leaders, product development manager, technical research manager, administrative assistant, research assistants, consultants, and field evaluators, but also all of the staff, trustees, practitioners, volunteers and friends of APH.

The strength of our research must be in the quantity and quality of our field-based research data that is applied to the development of products that serve our blind and visually impaired consumers. In addition we must continue to support and expand our efforts in basic research through partnerships with research entities, particularly, research universities that have master and doctoral level commitments. And finally, we must develop the tools to effectively communicate our findings to the entire community listed above.

The following quote by Harvard scholar Henry Louis Gates, Jr. is applicable to our goal of building a research community. He says, "Collecting data is only the first step toward wisdom, but sharing data is the first step toward community".

Ralph E. Bartley, Ph. D.
Director of Research

Advisory Committees

APH especially wishes to acknowledge the superb leadership and guidance from the Ex Officio Trustees serving as members of the Educational Services Advisory and Educational Products Advisory Committees. FY 2003 committee members were:

Educational Services Advisory Committee:

Chair – Daniel W. Boyd (CA)

2003 - Teresa Lacy (AL)

2003 - Louis M. Tutt (MD)

2004 - Gerald Kitzhoffer (NJ)

2004 - Stuart Wittenstein (SD)

Educational Products Advisory Committee:

Chair - Dotta Hassman

2003 - Kathleen Brown (MI)

2003 - Rosie L. T. Pridgen (MS)

2004 - Larry Brown (OR)

2004 - Mike Cole (CA)

2005 - Carol McCarroll (TN)

2005 - Kenalea Johnson (NM)

Advisory Committee Alternate

2003 - Elaine Sveen (MN)

Department of Research Staff

Educational Research

Aicken, John, M.B.A.	Product Development Manager
Bartley, Ralph, Ph.D.	Director
Cox, Valerie	Administrative Assistant
Creasy, Keith, B.S.	Programmer III
Eiland, Mario, B.A.	Programmer I
Hedges, John, B.S.	Programmer II
Hoffmann, Rosanne, Ph.D.	Research Assistant
Kitchel, Elaine, M.Ed.	Research Scientist
Meredith, Rob	Programmer III
Otto, Fred, B.A.	Research Associate (part-time)
Pester, Eleanor, M.S.	Research Scientist
Pierce, Tristan, M.I.A.	Research Associate
Poppe, Karen, B.A.	Senior Research Associate
Poppe, Tom	Model and Pattern Maker
Roderick, Carol, B.A.	Research Assistant (part-time)
Smith, Rodger, A.A.S.	Programmer I
Skutchan, Larry, B.A.	Research Scientist
Terlau, Terrie, Ph.D.	Research Scientist
Travis, Ann, B.A.	Research Assistant
Vaught, Monica, B.A.	Research Assistant
Wright, Suzette, B.A.	Research Associate (part-time)
Wright, Tessa, B.A.	Research Assistant

Technical Research Division

Donhoff, Darlene	Technical/Clerical Assistant
Hayden, Frank	Manager
McGee, David	Manufacturing Specialist
Robinson, James	Manufacturing Specialist

Accessible Tests Department Staff

Brogan, Gage, J.D.	Test Coordinator & Test Security Specialist
Coffey, Monica, B.A.	Accessible Test Editor
Henderson, Barbara, M.A.	Research Associate
Scott, Kristopher, M.A.	Accessible Test Editor
Willis, Deborah, M.A.	Director

Agencies Participating in Research

In addition to the agencies named here, appreciation is also extended to the many other agencies that cooperated with APH's research efforts by permitting members of their staffs to serve as consultants, reviewers, or respondents to requests for information.

Anchor Center for Blind Children, Denver, CO
Arkansas School for the Blind, Little Rock, AR
British Columbia's Children's Hospital, Vancouver, BC
California School for the Blind, Fremont, CA
Castro Valley School District, Castro Valley, CA
Colorado School of the Deaf and the Blind, Colorado Springs, CO
Cooke County Special Education, Gainesville, TX
Delta Gamma Center for Children with Visual Impairments, St. Louis, MO
Des Moines Public Schools, Student and Family Services, Des Moines, IA
Division for the Visually Impaired, New Castle, DE
Easter Seals; Wheeling, WV
Fairfax County Public Schools, VA
Georgia Academy for the Blind, Macon, GA
Helen Keller School for the Blind, AIDB, Talladega, AL
Home of the Innocents, Louisville, KY
Illinois School for the Visually Impaired, Jacksonville, IL
Kentucky School for the Blind, Louisville, KY
Louisiana School for the Visually Impaired, Baton Rouge, LA
Madison School, Madison, TN
Metro Davidson County/Nashville Public Schools Vision Office, Nashville, TN
Minnesota State Academy for the Blind, Faribault, MN
National Geographic, Washington DC
New Jersey Commission for the Blind, Toms River, NJ
Oklahoma School for the Blind, Muskogee, OK
Orientation Center for the Blind, Albany, CA
Overbrook School for the Blind, Philadelphia, PA
Perkins School for the Blind, Watertown, MA
Puunene School, Puunene, HI
St. Lucy's Day School, Upper Darby, PA
San Francisco State University; San Francisco, CA
SUNY Brockport, Brockport, NY
Tennessee School for the Blind; Nashville, TN
University of California at Berkeley, Berkeley, CA
University of Houston, Houston, TX
University of Louisville, Louisville, KY
Visually Impaired Preschool Services, Louisville, KY
W. Reily Brown Elementary School, Dover, DE

CONSULTANTS

In addition to the consultants formally acknowledged in this section, appreciation is extended to the many individuals who have willingly given of their time and expertise in cooperating with the various research and development projects underway by responding to questionnaires, by answering less formal queries for information, and by working with research staff in countless ways such as: (a) identifying particularly talented teachers and other professionals to serve on committees and/or as expert reviewers; (b) recommending programs, teachers, and students to participate in field tests; and (c) facilitating field evaluation efforts. Only through the splendid and continuing support of professionals working in the field and the people they serve is APH able to maintain an effective research and development program.

Amerson, Marie J., TVI Consultant, Macon, GA, [Sensory Learning Kit, Tangle Toy Kit]

Azer, Samir, Science Teacher for the Visually Impaired, Louisville, KY, [Science Skills Inventory]

Bailey, Dr. Ian, Doctor of Optometry, San Francisco, CA, [Optimizing the Reading of Continuous Text for Students with Low Vision]

Bass, Linda, Teacher of the Visually Impaired, Columbus, OH, [Science Skills Inventory]

Bender, Dianne, Teacher of the Visually Impaired, Nebraska Center for the Education of Children Who Are Blind or Visually Impaired, Nebraska City, NE, [Functional Assessment/Curriculum]

Calvert, Emily, Teacher of the Visually Impaired, Cypress-Fairbanks ISD, Houston, TX, [Sewing Without Sight]

Cook, Delenah, Teacher of the Visually Impaired, California School for the Blind, Fremont, CA, [Sewing Without Sight]

Cooper, Dick, Science Curriculum Developer, North Olmstead, OH, [Science Skills Inventory]

Cooper, Kathy, Science Teacher of the Visually Impaired, North Olmstead, OH, [Science Skills Inventory]

Corbett, Karen, Teacher of the Visually Impaired, Kentucky School for the Blind, Louisville, KY, [Sewing Without Sight]

Craig, Sandra, Math & Science Teacher for the Blind, Kansas City, KS, [Science Skills Inventory]

Dornbusch, Dr. Helen, Doctor of Optometry, San Francisco, CA, [Optimizing the Reading of Continuous Text for Students with Low Vision]

Dortch, Jenny [Primary Math Units]

Dumstorf, Chip, Graphic Design Specialist, IMAGE Corporation, Louisville, KY, [Smaller

Books Larger Print]

- Dunham, Jamie, Bellarmine University, Elizabethtown, KY, [Science Skills Inventory]
- Evans, Carol Anne, M.Ed., School Psychologist, Davis School District, Farmington, UT, [Woodcock-Johnson III (WJ-III) Tests of Achievement]
- Forbes, Robert, Geography Department, University of Louisville, Louisville, KY, [Large Print Color Atlas]
- Freeman, Roger, M.D., British Columbia's Children's Hospital, Vancouver, BC, [CVI Synergy West - May 16, 2003]
- Garberg, Robin [Fun with Braille]
- George, Sr. Elaine, Teacher of visually impaired students, St. Lucy's Day School, Upper Darby, PA, [Smaller Books Larger Print, Sewing Without Sight]
- Greer, Dr. Robert, Doctor of Optometry, San Francisco, CA, [Optimizing the Reading of Continuous Text for Students with Low Vision]
- Groenveld, Maryke, Ph.D., British Columbia's Children's Hospital, Vancouver, BC, [CVI Synergy West - May 16, 2003]
- Hall-Lueck, Dr. Amanda, Professor of Special Education, San Francisco State University, San Francisco, CA, [Optimizing the Reading of Continuous Text for Students with Low Vision]
- Harrell, Lois, Vision Consultant, Placerville, CA, [Moving Ahead: Tactile Graphic Storybooks]
- Health Care Financing Administration, Washington D.C., Large print and typography issues for government publications, [Smaller Books Larger Print]
- Heck, Becky, Science Teacher for the Visually Impaired, Indianapolis, IN, [Science Skills Inventory]
- Herrington, Joseph, Geography Department, University of Louisville, Louisville, KY, [Large Print Color Atlas]
- Hotta, Carol, Teacher of children with Visual Impairments and Certified Orientation and Mobility Specialist, Hawaii Department of Education, Wailuku, HI, [ENVISION I & ENVISION II]
- Hudgins, Betty, Testing Coordinator, Georgia Academy for the Blind, Macon, GA, [Kaufman Functional Academic Skills Test (K-FAST)]
- Huffman, Kim, Teacher of the Visually Impaired, Kendalville, IN, [Science Skills Inventory]
- Ingber, Janet, Music Therapist and author, New York, NY, [Parenting Book]
- Jackson, Ileah, California State University, Sacramento, CA, [Going Places: Transition Guidelines...]
- Jaffe, Lynne, Ph.D., Learning Disabilities Specialist, Technical Assistance to Schools Assessment Team, Arizona Schools for the Deaf and Blind, Tucson, AZ, [Woodcock-Johnson III (WJ-III) Tests of Achievement]
- Jan, Jim, M.D., British Columbia's Children's Hospital, Vancouver, BC, [CVI Synergy West - May 16, 2003]
- Jose, Dr. Randall, Doctor of Optometry, University of Houston, Houston, TX, [ENVISION I & ENVISION II]
- Kendrick, Deborah, Author and Journalist, Cincinnati OH, [Parenting Book]
- Koniak, Lane, Teacher of Visually Impaired, Portland, OR, [Large Print Color Atlas]
- Krause, Kathy, Braille Transcriber, Tucson, AZ, [Large Print Color Atlas]

Kreuzer, Debbie, Education Director, California School for the Blind Fremont, CA, [Sewing Without Sight]

Lee, Pauline, Teacher of the Visually Impaired, California School for the Blind Fremont, CA, [Sewing Without Sight]

Lieberman, Lauren, SUNY Brockport, NY, [Going Places: Transition Guidelines...]

Maier, Tracy, Teacher of the Visually Impaired, Indiana School for the Blind, Indianapolis, IN, [Sewing Without Sight]

Mamer, Linda, Ph.D., British Columbia's Children's Hospital, Vancouver, BC, [CVI Synergy West - May 16, 2003]

Matsuba, Carey, M.D., British Columbia's Children's Hospital, Vancouver, BC, [CVI Synergy West - May 16, 2003]

Mayeda, Ron, Teacher, California School for the Blind, Fremont, CA, [Sewing Without Sight]

Modell, Scott, California State University, Sacramento, CA, [Going Places: Transition Guidelines...]

Modaressi, Betty, B.S., Free Lance Writer, Chicago, IL [*Revision of Patterns & Braille Literacy for Older Students*]

Mowerson, Lisa-Anne, Director of Community and Support Services, Vision Services, Pittsburgh, PA, [*Label Kit*]

Murphy, Robert, Teacher of Special Education, Ft. Wayne, IN, [Functional Assessment/Curriculum]

Myers, Diana, Writer, Chicago, IL [Braille Literacy for Older Students]

O'Connor, Kevin E., Marriage and Family Therapist, Arlington Heights, IL, [Parenting Book]

O'Donnell, Betsy, Certified Orientation and Mobility Specialist, Philadelphia, PA, [Orientation and Mobility Family Book]

Pariso, Jill, Teacher of the Visually Impaired, Amherst, NY, [Sewing Without Sight]

Perla, Fabiana, Certified Orientation and Mobility Specialist, Philadelphia, PA, [Orientation and Mobility Family Book]

Perry, Shireen Irvine, Instructor, Orientation Center for the Blind, Albany, CA, [Sewing Without Sight]

Petrosko, Dr. Joe, Professor of Foundations of Education, University of Louisville, Louisville, KY, [Optimizing the Reading of Continuous Text for Students with Low Vision, Braille Production Study]

Ponchillia, Paul, Western Michigan University, Kalamazoo, MI, [Going Places: Transition Guidelines...]

Ray, Linda, Teacher of the Visually Impaired, Prairie Village, KS, [Printing Guide]

Roman, Christine, Ph.D., Marshall University, Huntington, WV, [CVI Synergy West - May 16, 2003]

Roth, Alan, Science Teacher for the Visually Impaired, Indianapolis, IN, [Science Skills Inventory]

Rychwalski, Paul J., M.D., Kosair Children's Hospital, Louisville, KY, [Sensory Learning Kit, Sewing Without Sight]

Sangree, Helen, Teacher of the Visually Impaired, Cypress-Fairbanks Independent School District, Houston, TX, [Sewing Without Sight]

Shepard, Christy, Teacher of the Visually Impaired, Cypress-Fairbanks ISD, Houston, TX, [Sewing Without Sight]

- Smith, Mildred J., Teacher of the Visually Impaired, Consultant, Garland, TX, [Sensory Learning Kit]
- Spittler, Margaret, Teacher of the Visually Impaired, Buffalo School 96, Buffalo, NY, [Sewing Without Sight]
- Stratton, Dr. Josephine, Consultant for the Visually Impaired for the State of New York, Norwich, NY, [Moving Ahead: Tactile Graphic Storybooks and Revision of the Handbook, On the Way to Literacy: Early Experiences for Visually Impaired Children]
- Strauss-Schwartz, Judith, Teacher of Visually Impaired, New York, NY, [Large Print Color Atlas]
- Truan, Dr. Mila, Reading Specialist, Tennessee School for the Blind, [Moving Ahead: Tactile Graphic Storybooks]
- van Naerssen, Judith, Occupational Therapist, Overbrook School for the Blind, Philadelphia, PA, [Sensory Learning Kit]

FIELD EVALUATORS

Braille DateBook

Amato, Sheila, Teacher of the Deafblind, East Islip High School, Islip Terrace, NY
Brown, Janet, Clinical Case Manager, M.F.T., Catholic Charities, San Rafael, CA
Brunson, Melanie, Director of Advocacy and Governmental Affairs, American Council of the Blind, Washington, D.C.
Byington, Ann, Rehabilitation Specialist, Kansas Rehabilitation Center for the Blind, North Topeka, KS
Calvert, Debbie, Teacher of the Visually Impaired, Scott County Board of Education, Georgetown, KY
Cooler, Alma Myrtle, Casper, WY
Cox, Mike, Procurement Specialist, Westinghouse Sevanah River Company, Aiken, SC
Descarage, Susan, Teacher of the Visually Impaired, Perkins School for the Blind, Watertown, MA
Dillon, Brenda, Resource Specialist, Jack Jakobik, Nashville, TN
Dixon, Judith M., Consumer Relations Officer, National Library Service for the Blind and Physically Handicapped, Library of Congress, Washington, D.C.
Dowling, Nancy, Activity Director, Beautiful Savior Nursing Home, Belton, MO
Drolet, Michele, Manager Student Relations, The Seeing Eye, Inc., Morristown, NJ
Gelles, Ann, Teacher of the Visually Impaired, California School for the Blind, Fremont, CA
Guillory, Eric, Resource Specialist, Louisiana School for the Visually Impaired, Baton Rouge, LA
Hanse, Buffa, Rehabilitation Specialist, Braille Teacher, Kentucky Department for the Blind, Louisville, KY
Henry, Laurel, Casper, WY
Kaufman, Howard, Social Worker, Badger Association of the Blind and Visually Impaired, Milwaukee, WI
Kendrick, Deborah, author and journalist, Cincinnati, OH
Knowles, Nancy, Clerk/Typist, Westinghouse Savannah River Site, Aiken, SC
Maurer, Patricia A., National Federation of the Blind, Baltimore, MD
McCall, Roberta, Rehabilitation Teacher, Michigan Commission for the Blind, Lansing, MI
McClarín, Jennifer, Teacher of the Visually Impaired, New Mexico School for the Visually Handicapped, Alamogordo, NM
Miller, Virginia, Rehabilitation Teacher, South Dakota Rehabilitation Center for the Blind, Sioux Falls, SD
Patel, Soniya, Teacher of Music, Lebanon Special School District, Lebanon, TN
Peaco, Freddie L., Government Information and Volunteer Specialist, National Library Service for the Blind and Physically Handicapped, Library of Congress, Washington DC

Salinger, Lisa, Rehabilitation Teacher, Pennsylvania Bureau of Blindness and Visual Services, Clarks Summit, PA

Sims, Ann, Braille Instructor, Center for the Visually Impaired, Atlanta, GA

Southard, Linda, Library Information Specialist, City of Virginia Beach, Virginia Beach, VA

Ward, Jean, Rehabilitation Instructor, Tennessee Rehabilitation Center, Smyrna, TN

Wheeler, Kathey, Independence, MO

Winkleblack, Marla, Visual Services Coordinator, Soyland Access to Independent Living, Decatur, IL

Braille Transcriber's Kit: US Maps

Davis, Debbie, Transcriber, Visual Aid Volunteers, Garland, TX

Dickey, Marilyn, Transcriber, Placer County Office of Education, Auburn, CA

Holliday, Debra, Transcriber, Braille Services, Houston, TX

McBride, Betsy, Transcriber, Dallas TX

Worthington, Dorothy, Transcriber, Learning Center, Anoka, MN

Transcribers and Educators of the Visually Handicapped, Burlingame, CA.

Functional Assessment/Curriculum

Bender, Dianne, Teacher of the Visually Impaired, Nebraska Center for the Education of Children Who Are Blind or Visually Impaired, Nebraska City, NE

Murphy, Robert, Teacher of Special Education, Ft. Wayne, IN

Label Kit

Mowerson, Lisa-Anne, Director of Community and Support Services, Vision Services, Pittsburgh, PA

Lots of Dots: Learning My ABC's

Courtney, Catherine, Teacher of the Visually Impaired, Minnesota State Academy for the Blind, Faribault, MN

Donnell, Libby, Parent, St. Louis, MO (through the Delta Gamma Center for Children with Visual Impairments)

Garner, S., Teacher of the Visually Impaired, W. Ross Macdonald School, Brantford, ON

Hausz, Andrea, Speech Therapist, Home of the Innocents, Louisville, KY

Horton, Lynn, Teacher of the Visually Impaired, Helen Keller School for the Blind, AIDB, Talladega, AL

Langdon, Melissa, Teacher of the Visually Impaired, Visually Impaired Preschool Services (VIPS), Louisville, KY

Olson-Murphy, Anne, Teacher of the Visually Impaired, Willamette ESD, Salem, OR

Rollings, Lynn, Teacher of the Visually Impaired, W. Ross Macdonald School, Brantford, ON

Schmidt, Elsa, Parent, Pueblo West, CO

Orientation and Mobility Family Book

Perla, Fabiana, Certified Orientation and Mobility Specialist, Philadelphia, PA

O'Donnell, Betsy, Certified Orientation and Mobility Specialist, Philadelphia, PA

Parenting Book

Ingber, Janet, Music Therapist and author, New York, NY

O'Connor, Kevin E., Marriage and Family Therapist, Arlington Heights, IL

Kendrick, Deborah, Author and Journalist, Cincinnati OH

Printing Guide

Ray, Linda, Teacher of the Visually Impaired, Prairie Village, KS

Sewing Without Sight

Perry, Shireen Irvine, Instructor, Orientation Center for the Blind, Albany, CA

Talking GlowDice

Chamberlain, Merry Noel, Teacher of the Visually Impaired, Des Moines Public Schools,
Student and Family Services, Des Moines, IA

Chambers, Darla, Elementary Teacher, Illinois School for the Visually Impaired,
Jacksonville, IL

Chance, Jean, Teacher of the Visually Impaired, Tennessee School for the Blind,
Nashville, TN

Cole, Mike, Administrator, Orientation Center for the Blind, Albany, CA

Greiner, Margaret, Teacher of the Visually Impaired, Puunene School, Puunene, HI

Harris, Avonda, Independent Living Skills Instructor, Oklahoma School for the Blind,
Muskogee, OK

Kelley, Charla, Supervising Teacher, Tennessee School for the Blind, Nashville, TN

LaVertu, Hope, Coordinator of Consumer Services, Kentucky Department for the Blind,
Charles W. McDowell Rehabilitation Center, Louisville, KY

Leister, Monica, Vision Specialist/Teacher, Tennessee School for the Blind,
Nashville, TN

Matthews, Beverly, Instructor/Teacher of the Blind and Visually Impaired, New Jersey
Commission for the Blind, Toms River, NJ

McIntosh, Essie, Independent Living Skills Instructor, Oklahoma School for the Blind,
Muskogee, OK

Niemczyk, Sharon, 2nd Grade Teacher, Arkansas School for the Blind, Little Rock, AR

Pohlmann, Vivian, Day Care Provider, Hastings, NE

Potenski, Donald, Manager, New Jersey Commission for the Blind, The Meyer Center,
Newark, NJ
Oaks, Tom, Recreational Leader, Kentucky School for the Blind, Louisville, KY
Rodzielowicz Gloria, New Jersey Commission for the Blind and Visually Impaired, Toms
River, NJ
Stevenson, Mae, ILS Instructor, Oklahoma School for the Blind, Parkview School,
Muskogee, OK
Van Wagener, Ellen C., Speech-Language Pathologist, Louisiana School for the Visually
Impaired, Baton Rouge, LA
Villandry, Diana, Oklahoma School for the Blind, OK
Wilson, Valerie, ILS Supervisor, Oklahoma School for the Blind, Muskogee, OK
Wood, Janet Shaheen, Teacher, Georgia Academy for the Blind, Macon, GA

Web Chase

Beadle, Susan, Teacher of the Visually Impaired, Overbrook School for the Blind,
Philadelphia, PA
Brewer, Susanne R., Teacher of the Visually Impaired, Metro Davidson County/Nashville
Public Schools Vision Office, Madison School, Madison, TN
Brown, Kim, Teacher of the Visually Impaired, Burlingame, IA
Feliz, Debbie, Teacher of the Visually Impaired, Mesa, AZ
Foster, Mary Ann, Teacher of the Visually Impaired, Cooke County Special Education,
Gainesville, TX
Frankl, Nancy, Teacher of the Visually Impaired, W. Reily Brown Elementary School,
Dover, DE
George, Sister M. Elaine, IHM, Librarian/Materials Assistant, St. Lucy Day School for
Children with Visual Impairments, Upper Darby, PA
Goldberg, Audrey, Teacher of the Visually Impaired, Fairfax County Public Schools, VA
Marano, Helene, Teacher of the Visually Impaired, Overbrook School for the Blind,
Philadelphia, PA
Megarry, Jan, Teacher of the Visually Impaired, Colorado School of the Deaf and the Blind,
Colorado Springs, CO
van Naerssen, Judy, Occupational Therapist, Overbrook School for the Blind,
Philadelphia, PA
Newfang-Stopyra, Nancy, Itinerant Teacher/Consultant, Division for the Visually Impaired,
New Castle, DE
Oaks, Tom, Recreation Leader, Kentucky School for the Blind, Louisville, KY
Van Wagener, Ellen C., Speech-Language Pathologist, Louisiana School for the Visually
Impaired, Baton Rouge, LA
Watson, Lisa, Teacher of the Visually Impaired, Mesa, AZ

Accessible Tests Department Activities FY 2003

Deborah H. Willis
Director

Accessible Tests Department
[Formerly Test Central] (Ongoing)

- Purpose: The original goal of *Test Central* was to ensure tests and assessments were provided in high quality, accessible media in a timely manner. In response to discussions and recommendations by APH's Educational Services Advisory Committee, Educational Products Advisory Committee and members of the Second *Test Central Council*, the charge of the Accessible Tests Department was expanded in August 2003. The updated goal is to provide tests, test preparation and practice tests, test administration manuals, and other test-related materials in high quality accessible media in a timely manner, to promote the inclusion of blind and visually impaired individuals during test development, and to enhance the test performance of blind and visually impaired individuals through research, education, and communication.
- Project Staff: Carol Allman, Lead Consultant and Instructor
Gage Brogan, Test Coordinator and Security Specialist
Monica Coffey, Accessible Test Editor
Barbara Henderson, Test and Assessment Project Leader
Kris Scott, Accessible Test Editor
Debbie Willis, Director of Accessible Tests Department
- Core team: Carol Allman, Lead Consultant and Instructor
Ralph Bartley, Director of Research
Bob Brasher, VP of Advisory Services and Research
Jack Decker, VP of Production
Tony Grantz, Manager of Contract Administration
Barbara Henderson, Test and Assessment Project Leader
Mary Nelle McLennan, Executive Advisor to the President
Jane Thompson, Director of Accessible Textbook Initiative Collaboration (ATIC)
Debbie Willis, Director of Accessible Tests Department
- Council: Carol Allman, Ph.D., Lead Consultant and Instructor, APH
Karen Barton, Ph.D., Research Scientist, CTB McGraw-Hill
Larry Brown, Manager, Oregon Textbook & Materials Resource Center
Nan Bulla, M.Ed., Independent Consultant, Texas School for the Blind and Visually Impaired (retired)
Betsy Case, Ph.D., Director of Research on Special Populations, Harcourt Educational Measurement

Steve Goodman, Director of Pupil Personnel Services,
California School for the Blind
Barbara Henderson, Test & Assessment Project Leader, APH
Leslie Lightbourne, Program Coordinator, Division of Student
Standards & Assessments, Louisiana Department of Education
Jean Martin, Director, Minnesota Resource Center for the Blind and
Visually Impaired
Suzanne Swaffield, Education Associate, Office of Assessment, South
Carolina Department of Education
Sandy Thompson, Ph.D., Research Associate, National Center on
Educational Outcomes/University of Minnesota
Debbie Willis, Director of Accessible Tests Department, APH

Background: During a brainstorming session concerning important projects to pursue, an initiative to develop a central location dedicated to developing standardized guidelines, processes and procedures related to test adaptation and production of tests in alternative media was proposed. This initiative was presented to the U.S. Department of Education (DOE). In February 2001, APH received confirmation from the U.S. DOE that *Test Central* was awarded some startup funding for FY 2001. At a meeting with APH's Advisory Committees, members of the two committees commended APH for conceptualizing Test Central, recognized the leadership role APH could play with regard to tests and assessments, and strongly encouraged continued efforts in this area.

An in-house Core Team was formed, and *Test Central's* initial tracks were identified:

1. Education and relationship building;
2. Test adaptation;
3. Adaptation and development of test-related tools and materials;
4. Identification and development of new tests;
5. Basic research into test-related issues.

Test Central received significant federal support throughout FY 2002 and 2003. Just prior to APH's 2002 Annual Meeting, a group of Annual Meeting attendees assembled for a preliminary meeting to outline guidelines for making tests accessible to blind and visually impaired individuals. Utilizing the input of this group, guidelines for test developers, publishers, editors, and transcribers were initiated. The idea of *Test Central* was presented at Annual Meeting and an open forum commenced to discuss test and assessment needs and to receive ideas from the audience. Building *Test Central's* infrastructure began in FY 2002 and networking with test developers and publishers got underway.

A *Test Central Council* was formed and met at APH in March 2002. Recommendations of the Council included:

- Develop, use, and share standard guidelines for adapting tests into braille, tactile graphic, large print, recorded, and electronic formats.
- Develop, use, and share concepts of universal design.
- Address, convey, and facilitate best practices and appropriate accommodations when testing or assessing blind and visually impaired individuals.
- Foster professional development in the test and assessment area.
- Conduct research on various “key” aspects of testing and the test-taking environment.

A training workshop for test editors was planned and conducted. The test editor trainees were tested to determine their level of test editing skills. The tests were scored and feedback was provided to each of the 21 trainees who had completed the take-home test. A second test editor training workshop was planned to follow immediately after the 2002 Annual Meeting. A Guidelines Development Committee Meeting was held to draft guidelines for test transcribers. Throughout FY 2002, *Test Central* project staff attended and presented at numerous relevant workshops and conferences. Articles regarding *Test Central* were written and published.

Two test editor positions were approved and advertised. Individuals interested in these positions were interviewed and two of the Research Assistants in the Department of Educational and Technical Research accepted these permanent, full-time positions. A national network of consultant test editors, transcribers, and producers was initiated. These individuals, groups, and agencies will be available to assist test developers and test publishers as needed. During the last quarter of FY 2002, APH decided that *Test Central* would become its own department, working side-by-side with ATIC staff, under the general direction of the Vice-President of Products and Services, Bob Brasher. Further development and efforts of *Test Central* continued under the direction of Debbie Willis. Another *Test Central* position, that of Test Coordinator and Security Specialist, was approved and advertised late in FY 2002. During the last quarter of the 2002 fiscal year, *Test Central* began taking on some pilot projects to edit tests and test prep materials for presentation in braille with accompanying tactile graphics.

Test Central activities included developing and making available position papers that address a variety of test-related issues and areas of concern. Position papers in response to commonly asked questions will provide a basis for decision making as test personnel determine fair and appropriate accommodations for blind and visually impaired test takers. The first position paper was written by Dr. Terri Terlau and Fred Gissoni and addressed use of the abacus in test-taking situations.

Work Completed in FY 2003: At the beginning of FY 2003, a second Test Editor Training Workshop was held at APH. The trainees, made up of teachers and transcribers, came from Alabama, Georgia, Indiana, Kentucky, Massachusetts, Maryland, New Mexico, South Carolina, and Tennessee. Information conveyed focused on the No Child Left

Behind Act of 2001; *Test Central's* goals and activities and their relevance to the vision field; considerations when reviewing test items to determine accessibility for blind and visually impaired students; guidelines to utilize when editing print tests for presentation in braille, tactile graphics, and large print; creating a good tactile graphic; and features of print that enhance readability. Trainees were given templates and provided instruction on preparing Notes for Test Transcribers and Test Administration Notes. Presentation of sample test items offered ample opportunity for the trainees to work in small and large groups to practice and discuss what they had learned. Take-home tests were distributed to the test editor trainees to maximize quality and standard editing among test editors. These tests also enabled the trainees to receive individualized feedback.

In January 2003, Gage Brogan accepted the Test Coordinator and Security Specialist position. Moreover, APH Test and Assessment Project Leader Barbara Henderson transferred from Educational Research to *Test Central* in order to unify effort, maximize service to the field, and increase consistency in test editing and presentation. Identification of high priority test needs that result in catalog items, as well as test-related work done on a contract basis, were redirected to flow through a single channel, Test Central, rather than through different departments. At this time, Barbara Henderson took on primary responsibility for working with APH's web site coordinator to develop site content and construct a direct link from APH's main page to *Test Central's* page. *Test Central* staff worked with APH's Communications Group and Impact Imagination staff to develop a design for the *Test Central* banner to be used on the main page of the APH web site and *Test Central's* web page.

Consultants Mary Ann Damm and Bev Pfister continued the work of developing guidelines for test transcribers, a project begun last fiscal year. Consultant Carol Allman drafted a position paper on the use of extended time when administering standardized tests to blind and visually impaired students. Carol also provided a number of presentations, which included the state AER conferences at Arkansas and New Mexico and partnering with NCEO at the Council of Chief State School Officers Conference (CCSSO) on Large Scale Assessment. The CCSSO pre-conference workshop addressed *Assessment Architecture: Building Universally Designed Large Scale Assessments*. Carol's presentation focused on elements of universal design and special considerations for making tests accessible to students with visual impairments. Consultants Carol Allman and Bev Pfister served as APH representatives at the CTEVH Conference and gave a presentation on *Making Tests Accessible for Students with Visual Impairments*. The educator-transcriber partnership and perspectives resulted in an excellent presentation. Accessible Test Editor Monica Coffey attended the 2003 Council for Exceptional Children Conference while Kris Scott attended the National Braille Association's 27th Conference.

In February 2003, Debbie Willis and Gage Brogan conducted a poster session on *Options for Making Tests Accessible* at the Association of Test Publishers (ATP) Conference on Technology in Testing. At the same conference, Jim Allan, project consultant, and author, and Barbara Henderson, Project Leader, presented a poster session on *Test Access: Guidelines for Computer Administered Testing*. Many interested individuals visited

the session to ask about speech access and the difficulties associated with the inaccessibility of mouse movements to totally blind individuals. Some sessions addressed accommodations, test security, and converting tests from English to other languages. In one session, the presenter proclaimed that "The legal defensibility of a test is primarily rooted in the pilot and test revision phases," and that "the population who will be tested with an instrument needs to be represented in the pilot test phase." These statements provide significant justification for the inclusion of blind and visually impaired students during test development as tests are constructed and field tested. Announced during one of the general sessions was ATP's intent to join efforts with the American Educational Research Association and the Council of Chief State School Officers (CCSSO). This should be a powerful partnership.

The second meeting of the *Test Central Council* (TCC) was held at APH in early Feb. 2003. Three major test developers and publishers, Harcourt, CTB McGraw-Hill, and Data Recognition Corp. (DRC) were represented at this meeting. TCC members, along with special guests Alice Golden from DRC and Linnie Calland from Kentucky Department of Education, were joined by an array of APH staff that included *Test Central Core Team* members. The purpose of this meeting was to share information relevant to testing and to update TCC members on the activities and goals of *Test Central* so TCC members could provide advice and direction on next steps for *Test Central*. Several discussions focused on common problems involved in testing students with disabilities. Sandy Thompson, Research Associate at the National Center on Educational Outcomes (NCEO), reported that NCEO performs disability-related research on state assessments and has a wealth of information in a searchable database. Jean Martin, Director of the Minnesota Resource Center for the Blind and Visually Impaired, briefly described the process for addressing bias in Minnesota State standardized tests. These guidelines were published this fiscal year in the spring issue of *RE:view*. Linnie Calland from the Kentucky Department of Education presented the online version of Kentucky's Commonwealth Accountability Testing System (CATS). Jane Thompson, APH's Director of ATIC, presented some projects at APH that will eventually impact *Test Central*. These include the *Large Print Project* for developing large print textbooks and the Braille Transcription Training Program. Elaine Kitchel, APH's Low Vision Project Leader, presented guidelines and considerations for readability of test documents in large print. Tactile Graphics Specialists Karen Poppe and Fred Otto distributed and reviewed examples of practice test items that are difficult to make accessible.

Some of the recommendations that resulted from the Second TCC included:

- Conduct research on tactile graphics, large print, and universal design issues related to tests and assessments.
- Determine the best way to present different graphics in accessible media.
- Recommend language and points for states to consider in establishing test contracts.
- Develop and maintain an adapted test item data bank.

- Utilize standard symbols determined by BANA for tactile graphics in tests.
- Determine best way for blind and visually impaired students to accomplish performance items.
- Promote availability of practice materials in accessible media.
- Promote the need for blind and visually impaired students to be included in the pilot test phase of test development.

Shortly after the Second TCC Meeting, a letter of support for NCEO's proposed research project on *An Examination of the Use of Multiple Modalities for the Achievement of Literacy Standards by Students with Disabilities* was written and submitted to NCEO's Dr. Sandy Thompson. NCEO received funding for this project from OSERS Research and Innovation to Improve Services and Results for Children with Disabilities. The research design that originally included deaf, hard of hearing, and English as a second language learners was expanded to include blind and visually impaired students. APH and NCEO will partner early next fiscal year to study the effects of item design on test performance. Ten large print readers in each of grades 4 and 8, and 10 braille readers in each of grades 4 and 8 will participate in a think aloud study in order to gather information on the processes utilized by blind and visually impaired students to solve math problems, many of which include tactile graphics. The findings of this study will be used to establish universal design elements of tests. In addition, in order to help maximize student performance on tests, results of this study will be incorporated into specific guidelines being written on *Making Tests Accessible to Students with Visual Impairments*.

APH Field Services Representative Burt Boyer and Debbie Willis participated in a National Agenda Meeting in Austin, Texas. A number of recommendations were developed during this meeting and National Agenda Committee members requested the continued involvement of APH in promoting National Agenda Goals. Burt Boyer will co-chair Goal 1: Referral with Chris Tompkins (Foundation for Blind Children) while Debbie Willis will co-chair Goal 6: Assessment with Dr. Mary Ann Lang (The National Center for Vision and Child Development, The Lighthouse Incorporated).

In spring 2003, the name of the department was changed from *Test Central* to *Accessible Tests Department*. A one-page flyer on *Test-Related Services Available from APH* was developed. During much of the spring and summer, Test Coordinator and Security Specialist Gage Brogan was committed to studying and implementing additional test security measures at APH. Activities included preparing a test security alert notice and initiation of test security training. APH submitted to a company inspection, provided all the necessary paperwork, and satisfied the necessary requirements of Educational Testing Service (ETS) in order to be certified by ETS as a secure test vendor. In addition, Gage worked with a wide variety of APH staff to develop test transcription specifications and to set up a database for test tracking, production activities, and record keeping.

Guidelines under development were reviewed, revised, and, in some cases, completed. Guidelines underway or completed include:

- Guidelines for Computer Administered Testing
- Making Tests Accessible to Students with Visual Impairments: A Guide for Test Publishers and Test Developers
- Test Transcribers Guidelines for Braille Editions
- Test Editor Guidelines for Providing Direction to Test Transcribers: Braille Formats
- Test Editor Guidelines for Providing Direction to Production Staff: Large Print Tests
- Guidelines for the Production of Tests in Audio Format

All of these guidelines will be made available as part of the *Test Access* series. The first two sets of guidelines listed above were completed this fiscal year. The *Guidelines for Computer Administered Testing* are available on the Accessible Tests Department web page. The first edition of *Making Tests Accessible to Students with Visual Impairments: A Guide for Test Publishers and Test Developers* were used for the Test Publisher Workshop held at APH in September 2003.

During FY 2003, over 100 tests were edited and *Notes for Test Transcribers* were written by Accessible Test Editors Kris Scott and Monica Coffey for presentation of tests in braille/tactile format. Most of these tests also required Test Administration Notes. Audio transcripts of some tests were created so that editing and verbal instructions could be reviewed, and guidelines for audio formats could be expanded and improved. In addition, some experimental work in creating large print samples of two tests, one math and one literary, began. The experimental work involved four different enlargement processes: simply increasing the font size as much as possible to fit on an 8 1/2" X 11" page, utilizing ATIC's large print process to modify a number of features of the test while maintaining the 8 1/2" X 11" page size, and working with two Louisville-based printing companies to edit the tests as needed in order to provide 18 point text and enlarged graphics. In July 2003, a group consisting of APH middle and upper management, as well as representatives from other departments, decided that the Accessible Tests Department would enter an operational phase in the areas of braille, tactile graphics, and audio formats, and would continue in a pilot phase for large print and electronic test formats.

After completing this experimental project, it was decided to create a sample test that would demonstrate making test items accessible in various media. Released test items were used with permission from Illinois and Ohio Departments of Education. The items were edited and coordinated for production of the sample test in large print with enlarged graphics, braille with tactile graphics, an audio cassette version, and two different audio CD versions. The three audio tests were coordinated with the large print and braille editions to be usable independently in a small group-testing environment.

In Sept. 2003, 24 staff members from the following test publishers participated in a

workshop hosted by the Accessible Tests Department: American Guidance Service, American Institutes on Research, CTB McGraw-Hill, Data Recognition Corporation, Educational Testing Service, Harcourt Educational Measurement, Measured Progress, NCS Pearson, Northwest Evaluation Association, and WestEd. The purpose of this workshop was to provide information on test development and adaptation to help ensure accessibility so that *No Child is Left Behind*, and to address critical issues in providing accessible tests for students with visual impairments. The sample test that had been created in multiple accessible media was used at the Test Publishers Workshop. It will also be used during a number of training workshops and presentations planned for next fiscal year, including the *AFB Bridging the Gap Leadership Summit* to be held in Atlanta early in FY 2004.

In the last quarter of FY 2003, APH was notified that the Accessible Tests Department had been awarded its first contract to edit and produce the 2004 statewide assessments in large print for an individual state. The contract also includes provision of these same tests in a braille/tactile format. Test Administration Notes for the accessible media and some manipulatives are needed as well.

In order to begin addressing the expanded charge of the Accessible Tests Department to provide practice test and test prep materials in accessible media, Barbara Henderson developed a short online survey that was posted on APH's web site. The *Let's Get Ready for Testing* survey asked trustees and vision teachers which practice materials and/or test prep materials they are currently using and what materials are needed.

Carol Allman drafted a *Survey of State Assessments and Accountability Initiatives: Inclusion of Students with Visual Impairments*. The survey was reviewed by professionals in the field as well as by members of the Accessible Tests Department. The survey will be modified and distributed to vision teachers and school administrators in early FY 2004.

Work Planned for FY 2004: FY 2004 promises to be another busy, challenging, and rewarding year. Starting with APH's 2003 Annual Meeting, Barbara Henderson and Carol Allman will give a presentation on using *Brigance Green Materials*. Two poster sessions will also be offered. Depending on the need, at least one and perhaps two workshops on *Making Tests Accessible to Blind and Visually Impaired Students* will be conducted for state assessment personnel. The first such workshop is tentatively planned for January 2004. A similar workshop will be conducted on site on a contract basis for one or more test publishers. The Accessible Tests Department will partner with ATIC at four Transcriber Training Workshops to be held in different areas of the country. The half-day provided by Accessible Tests will focus on reviewing test transcription specifications and guidelines. Another workshop on testing and assessing the knowledge and skills of blind adults will be provided as part of AFB's Bridging the Gap Leadership Summit. Harcourt and APH will also partner at the 2004 CCSSO Conference for a workshop on test access. Additional presentations and workshops will be given at other locations such as during the ATP, International AER, and some state AER conferences.

APH will produce prototypes of math items in large print with enlarged graphics and in braille with tactile graphics for the NCEO-APH research study that was initiated last fiscal year to study the effect of item design and presentation. Accessible Tests Department staff and assistants from Florida State University will gather data from large print and braille readers. The data will be analyzed, conclusions drawn, and a final report submitted by NCEO research staff.

Accessible Tests Department staff will undertake a number of pilot projects to edit and produce standardized tests in large print. Staff will review test items, edit tests for presentation in braille, tactile graphics, and audio formats, and coordinate the editing of test items for multi-media presentation of test items. Necessary steps will be taken to ensure test security, completion of tests in high quality accessible media, and timely delivery. The area of electronic testing of blind and visually impaired students will continue to be investigated.

The goals and activities of the department will continue to be monitored and direction will continue to be received from APH's two Advisory Committees, Executive Committee members, Council members, Core Team members, trustees, teachers, test personnel, and test takers. The guidelines, processes, procedures, databases and forms that have been developed will be used and modified as needed. Staff development will continue by attending classes, workshops and conferences, networking with teachers, test administrators, test developers and publishers, state assessment personnel, and test takers, and by observing or assisting with the administration of tests in various media to blind and visually impaired students.

Tests & Assessments

Barbara Henderson

Functional Assessment/Curriculum (Continuing)

Purpose: To provide assessment tools for daily living/functional skills for students in primary grades, middle school, secondary school, and transition classes.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Barbara Henderson, Project Advisor
Dianne Bender, Project Consultant
Robert Murphy, Project Consultant
Ann Travis, Project Assistant

Background: As the Expanded Core Curriculum becomes increasingly important in the education of students who are blind or visually impaired, a systematic method for assessing a student's progress in learning functional skills becomes essential. Many schools for the blind, university training programs, and rehabilitation agencies have developed their own strategies for teaching and assessing different aspects of self-care and daily living tasks. However, a systematic assessment process that incorporates a criterion-based scoring system and utilizes core curriculum skills in all levels of its functional assessment has not been made widely available. The need for such a comprehensive system has been expressed by numerous educators of persons who are blind or visually impaired.

Dianne Bender's assessment system for functional skills has been developed during her extensive teaching career in a residential school for the blind setting. Comprehensive coverage of functional skill areas, scoreable testing protocols, and concise, clear testing directions suggest that her system could serve as the basis for a functional assessment product.

Because Ms. Bender's assessment materials included extensive, concrete descriptions of tasks and techniques to be tested, it was initially proposed by the Project Leader to develop both an Assessment System and a Teaching Curriculum. It was additionally proposed to produce these materials in modular form, with each module including a curriculum and assessment for all levels of one category of functional skills.

Work During FY 2003: Strategies for developing curricula from existing assessment modules were discussed with Ms. Bender and initial drafts of such teaching strategies were explored. Although a functional skills curriculum related to the content of Ms. Bender's methods and assessment protocols was desirable, the combined curriculum and assessment was found to be beyond the scope of one project. The APH Product Advisory and Review Committee (PARC) adopted the Project Leader's recommendation to limit the current project to the development of a *Functional Skills Assessment* package.

Because the scope of the project has been reduced, the assessment of various content categories will be developed simultaneously. The full *Functional Skills Assessment* is expected to be released as one product and not as separate content category modules.

Work Planned for FY 2004: Refinement and completion of the *Functional Skills Assessment* prototype is anticipated. Location of suitable field reviewers and field test sites will be begun.

Kaufman Functional Academic Skills Test (K-FAST) (Continuing)

Purpose: To provide a functional mathematics and reading skills assessment in accessible formats for visually impaired and blind individuals between 15 and 85 years of age.

Project Staff: Barbara W. Henderson, Project Leader
Betty Hudgins, Project Consultant
Monica Coffey, Project Assistant
Kristopher Scott, Project Assistant

Background: Information from teachers and service providers has indicated that there is a great need for functional skills assessments in accessible formats for high school students and adults. The *K-FAST* is being acknowledged as one of the best assessments of its kind, and the Kaufman tests are well-known and respected in assessment circles. Appropriate for testing mastery of real-life skills, *K-FAST* can be administered in a short session. In addition, the layout of *K-FAST* lends itself well to adaptation for both large print and braille readers.

Results of the online survey compiled in October 2001 indicated that *K-FAST* ranked third in terms of priority amongst five frequently requested testing titles. Thirty-nine persons from across the country responded: school psychologists, teachers of the visually impaired, testing coordinators, and heads of instructional materials centers, etc. It was clear from the results that practitioners were familiar with *K-FAST* and desired access to braille and large print versions of the test.

In early November of 2001, a project consultant was hired. Betty Hudgins, Testing Coordinator at Georgia Academy for the Blind, made a trip to APH for a working meeting at the end of November. An item by item analysis revealed the need for two separate editions rather than a combined large print and braille edition. Product specifications and plans were revised accordingly.

A similar analysis of items for the braille edition was done via teleconference with the consultant in a successive 3-month period. By May 2002, a product development meeting was held to adjust project time lines and set final product specifications. In July

2002, the Project Leader and consultant had rewritten the test administration notes and the student instructions to reflect the new format.

Work During FY 2003: Artwork for the covers was drawn and approved by the Project Leader. Layout of the diagrams and text for the large print edition was begun by APH Communications Group staff and proofread by project staff. Specifications and electronic files for the production run were finalized and forwarded to production personnel in the last quarter of FY 2003. Lastly, braille transcription and large print master were begun.

Work Planned for FY 2004: Braille transcription, large print reproduction, proofreading, and quality control checks will be completed. The production run is projected to occur in the second quarter of FY 2004 and the product will be stocked and made available for sale.

Large Print / Braille Toss-Away Protractor (New)

Purpose: To provide an accurate, inexpensive, disposable, and easy-to-use protractor with both large print and braille markings to be used primarily by blind and visually impaired students in a testing situation.

Project Staff: Barbara W. Henderson, Project Leader
Frank Hayden, Project Technical Advisor
Debbie Willis, Project Advisor
Monica Vaught, Project Assistant

Background: Blind and visually impaired students taking tests do not always have appropriately designed protractors provided to them in the testing situation. Sometimes they don't get a protractor at all because protractors aren't included with the tests. A well-designed, affordable, print/braille protractor provided as part of the assessment tool and available for classroom use before the exam will optimize testing outcomes. The protractor will be included with tests calling for the use of a protractor, as well as being available as a separate item.

After a 2002 survey of the kinds of protractors being used by math students across the country (part of the field test results on the large print/braille ruler field test), the development of the *Large Print/Braille Disposable Protractor* (now called *Large Print/Braille Toss-Away Protractor*) was put on hold and pulled back to the PARCing Lot. It was determined that several different protractors are being used by school systems across the country (including the APH Braille/Print Protractor with Goniometer). It was noted that training in use of the particular protractor being used for testing is considered very important for the best testing outcomes. In addition, protractors come in several sizes,

not all of which are appropriate for use with large print and/or braille tests. Therefore, further research is being done to decide if a protractor can be successfully produced in paper, and, if so, which design and size(s) should be used.

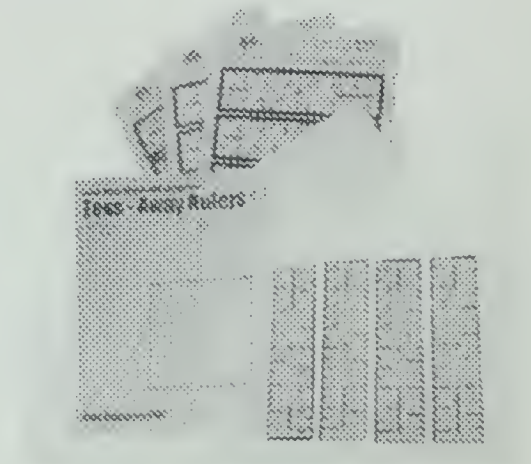
Work During FY 2003: The Project Leader received several new inquiries from test publishers and assessment personnel regarding the desire for a disposable braille protractor so this project was revived and removed from the PARCing lot in July 2003. A project assistant was assigned and a review of currently available tactile protractors was begun.

Work Planned for FY 2004: Prototype design will begin. A consultant in precision measurement will be employed. Field testers will be selected and field testing will be performed.

Large Print / Braille Toss-Away Ruler (Completed)

Purpose: To provide an accurate, inexpensive, disposable, and easy-to-use ruler, with both large print and braille markings to be used primarily by blind and visually impaired students in a testing situation.

Project Staff: Barbara W. Henderson, Project Leader
Frank Hayden, Project Technical Advisor
Monica Coffey, Project Assistant



Background: Many assessment instruments are produced in braille and large print without the accompanying materials that sighted students get. Blind and visually impaired students taking tests do not always have appropriately designed rulers provided to them. Sometimes they don't get a ruler at all because rulers aren't included with the tests. A well-designed, affordable, large print ruler, provided as part of the assessment tool and available for classroom use before the exam will optimize testing outcomes. This ruler will be included with mathematics tests that involve measurement tasks as well as made available for sale separately.

Field test results of the *Large Print/Braille Toss-Away Ruler* indicated that over 50 percent of the participants (and their teachers) wanted a large print only ruler. While measuring with the prototype ruler, the braille dots embossed on top of the large print markings often obscured the numbers and words. A second product was created and designed using the revised prototype but without raised lines and braille.

Work During FY 2003: Product costs were determined and the final production run occurred. Both rulers were produced and placed in stock in March 2003. Design of the

web brochure, with pictures, was completed in April 2003 with the assistance of the APH Communications group.

National Literary Braille Competency Test Revised (Continuing)



Purpose: To collaborate with the National Library Service for the Blind and Physically Handicapped (NLS) to help formulate and produce a revised competency test that ensures braille teachers meet standard qualifications for knowledge of the literary braille code.

Project Staff: Barbara W. Henderson, APH Co-Project Leader
Eleanor Pester, APH Project Consultant
Debbie Willis, APH Project Consultant
Mary Lou Stark, NLS Co-Project Leader
Judy Dixon, NLS Project Assistant
Deirdre Knapp, HumRRO Project Consultant
Gordon Waugh, HumRRO Project Consultant
Kristopher Scott, APH Project Assistant

Background: In recent years, concern has been expressed about the amount and quality of braille instruction provided to blind children and adults. In response to this concern, the Committee on Joint Organizational Effort requested that NLS develop a literary braille competency test. Work on this test began in 1989. Administration of the test began in 1994. In 1996, the Human Resources Research Organization (HumRRO) began a validation study of the test, conducting a thorough job analysis and furnishing recommendations for revising the test's content so that it closely matches the current knowledge and skills required of braille teachers. In April of 1998, NLS approached APH with a proposal for a joint effort in revising this test. A meeting was conducted at APH in May 1998 with personnel from HumRRO, NLS, and APH to review the validation process and recommendations.

In July 1998, an agreement between APH and NLS was set. APH's goals included maintenance of a test item bank database and production of test-related materials. NLS

was responsible for administering the pilot study, identifying proctors, handling the application process, and supervising test administration sites. APH and NLS agreed to be jointly involved in the revision phase of the project. Joint staff identified members of two standing committees: the Administrative Issues Committee and the Test Development Committee.

In 1999, under the direction of HumRRO staff, the Administrative Issues Committee met in January at NLS and in July at APH, and the Test Development Committee met in March at NLS and in June at APH. New test items were developed based on HumRRO's research, and test administration manuals were drafted and reviewed.

In 2000, an in-depth review of test items, the candidate's guide, and the test administrator's manual were conducted by NLS and HumRRO. APH worked with HumRRO on development of a machine scoreable, multiple-choice, answer sheet for both print and braille users. A prototype has been used successfully with ten blind APH employees and was subsequently incorporated into the pre-test.

In 2001 the Test and Assessment Project Leader became involved in this project. NLS rescheduled the timeline during 2001, setting project completion for 2002. Pre-test materials were produced at APH for phase I, a scoring protocol was developed, and the pre-tests were administered and scored by both NLS and APH personnel, ensuring scoring consistency and test validity.

Scoring of the pre-test was completed in FY 2002. When scoring results were in, feedback from all participants and scorers of the pre-test were assembled into appropriate revisions. With revisions completed, materials for the next phase, the pilot test, were produced by APH. Test portions were produced in three media: braille, large print, and recorded cassette. NLS arranged for shipment of materials to each pilot test candidate and each test administration site.

Work During FY 2003: The Operational Pilot Test was administered in Fall 2002 and Spring 2003. Members of the Test Development Committee arranged for test candidates and participated in administration of the pilot test. Each member offered feedback about test instructions and scoring protocols. Scoring of the test was done by both APH and NLS to assure test validity.

Work Planned for FY 2004: At such time as the scoring is completed, test performance results will be forwarded to HumRRO for analysis. HumRRO will write the final report. All facets of the project, from production, to test procedures, to scoring, will be reviewed by the Test Development and Administrative Issues Committees during meetings at NLS. APH project personnel will attend these meetings. If further revisions are required, the timeline will be adjusted. When the actual test is ready for use, APH will prepare the test materials while the test registration and scoring will be done by NLS.

Practice Materials/Test Preparation Materials (New)

Purpose: To make generic test preparation and practice materials available in accessible formats for purposes of preparing K-12 visually impaired and blind students to take achievement tests. Adult students preparing for the GED may also utilize these materials.

Project Staff: Barbara Henderson, Project Leader
Debbie Willis, Project Advisor
Kristopher Scott, Co-Project Leader

Background: During Spring 2003 meetings of the APH Educational Products Advisory Committee (EPAC) and the Educational Services Advisory Committee (ESAC), practice/test preparation materials in accessible formats were identified as a high priority need. Even if students are able to get their tests in accessible formats in a timely manner, there is no guarantee that they will have the same access to test prep materials. The advisory groups expressed their desire to see APH make such materials available as a catalog item. Furthermore, as an extension of the stated goals of the Accessible Tests Department, *provision of practice/test prep materials in accessible formats* was added at the request of the advisory committees.

Work During FY 2003: The Project Leader had already reviewed commercially available test prep packages prior to proposing it as a new project. In June 2003 the Project Leader, with the help of the APH librarian and an assistant, did a complete search of all currently available generic practice materials for standardized and achievement tests. A review of the materials was begun.

Work Planned for FY 2004: Once the best packages are selected from among those available, members of the APH advisory committees will be asked to review them. Sample materials in braille and large print will be produced and field tested.

Psychoeducational Assessment of Students Who Are Visually Impaired or Blind: Infancy Through High School, 3rd Edition (Discontinued)

Purpose: To make significant materials available on the assessment of blind and visually impaired students.

Project Staff: Debbie Willis, Director, Accessible Tests Department
Mary Nelle McClennan, Executive Advisor to the President
Barbara Henderson, Test and Assessment Project Leader
Monica Vaught, Research Assistant, Educational Research

Background: PRO-ED, Inc. published the first and second editions of *Psychoeducational Assessment Of Students Who are Visually Impaired or Blind: Infancy Through High School* in 1991 and 1994, respectively. The book includes an overview of assessment; issues in understanding children who are visually impaired or blind; assessment issues and procedures; assessment of infants and toddlers; assessment of preschoolers; assessment of school-age students; and a reference section. From 1994 to 2000, PRO-ED sold 1,481 copies, which is below their minimum cutoff to continue publishing the book; therefore, publication of the book was discontinued. PRO-ED very generously returned the copyright to Dr. Sharon Bradley-Johnson in order to pursue publication elsewhere.

Plans for a third edition were underway by Sharon Bradley-Johnson and a colleague in Central Michigan University's Psychology Department, Dr. Sandra Morgan. Their plans for changes to the third edition included: updating the test reviews with new editions of the tests, adding a description of the procedure and technical adequacy for curriculum-based measurement with braille readers, expanding the section on family issues, adding a section on considering sleep problems as part of the assessment process, adding a discussion of teacher concerns when students with severe visual losses are placed in the regular classroom setting, and adding a table describing test options for each area.

A copy of the second edition of the book was presented to APH's Product Advisory and Review Committee for consideration as an APH product. It was decided that this popular and respected book met specific project goals, and the project received approval to move forward. Dr. Sharon Bradley-Johnson was informed of APH's intention to support and publish the book.

In FY 2002, a contractual agreement was developed and the project authors began work on the third edition. Meanwhile, project staff held a Products Development Committee Meeting to discuss the project and establish a timeline for the research and development phases of this book. Eleven qualified field reviewers were identified and contacted regarding their willingness to review the book. Six of these consultants agreed to review the initial draft of the third edition. A cover letter along with an evaluation form was developed. An electronic copy of the book accompanied by the letter and evaluation form were sent in the winter of 2002 via email followed by a paper copy of the same to each of the six reviewers. Upon receipt of the materials, one of the six reviewers strongly recommended another reviewer who was contacted and sent the same, and one of the six had a colleague review the book. A total of seven complete reviews and one partial review were received. In addition to completing the evaluation forms, seven reviewers provided numerous notes on the draft edition. These results were sent to APH project staff. After removing all indications of reviewers' names, the completed evaluation forms and drafts containing notes and suggestions for changes were sent to the authors. While the reviews were favorable, numerous excellent suggestions were provided. In the spring of 2002, necessary changes were outlined by the authors and the revision phase was initiated in summer 2002.

Work Completed in FY 2003. A second draft of the book was received and reviewed by project staff. An additional step to have the document reviewed for content was undertaken. Three content reviewers were identified and contacted. Some strong recommendations for additional changes to make the information more relevant and thorough were received. As a result of the No Child Left Behind Act of 2001, there has been a significant increase in the number of assessment articles written and published. In light of numerous current articles and up-to-date books which are wholly or partly dedicated to assessment of blind and visually impaired students, such as AFB's second edition of *Foundations of Education* and their new book on *Collaborative Assessments*, the need to continue this project was in question. Project staff consulted with APH's Product Advisory and Review Committee (PARC) on whether to continue investing valuable resources into refinement and completion of the 3rd Edition of *Psychoeducational Assessment of Students Who Are Visually Impaired or Blind*. The decision was to discontinue this project.

Work Planned for FY 2004. No additional work on this project is planned.

The Psychoeducational Assessment of Visually Impaired Persons: **Video Update** (New)

Purpose: To revise and update the existing video in order to support the 3rd Edition of Sharon Bradley-Johnson's book entitled *Psychoeducational Assessment of Students Who Are Visually Impaired or Blind: Infancy Through High School*. The video provides excellent general information on assessing visually impaired and blind children as well as identifying specific testing instruments designed for this purpose.

Project Staff: Barbara Henderson, Test and Assessment Project Leader
Debbie Willis, Project Advisor
Monica Vaught, Project Assistant

Background: Although the video can stand alone, it is somewhat tied to the content of the book and vice-versa. The project to update the video to accompany the revision of Dr. Sharon Bradley-Johnson's book, *Psycho-educational Assessment of Students Who Are Visually Impaired or Blind: Infancy Through High School*, was brought to Product Evaluation Team (PET) shortly after the revised version of the book was sent to outside reviewers. The project was approved by PET and placed on the PARCing lot for further development at such time as final revisions of the book seemed imminent.

Work During FY 2003: In May 2003, the Project Leader again discussed the idea of updating the video. The project was pulled from the PARCing lot for further work such as cost estimates, scripting ideas, and suggested revisions. A project assistant was assigned.

Work Planned for FY 2004: Since the 3rd Edition of *Psychoeducational Assessment of Students Who Are Visually Impaired or Blind: Infancy Through High School* has been discontinued, the video will be briefly edited to correct some information. This video will be sold for at least another year, after which time a new assessment video project will be undertaken.

Test Access: Guidelines for Computer Administered Testing (Completed)



Test Access

Guidelines for
Computer Administered Testing*

Purpose: To develop guidelines for computer administration of tests and assessments to students/clients who are blind and visually impaired.

Project Staff: Barbara W. Henderson, Project Leader
Larry Skutchan, Project Advisor
Debbie Willis, Project Advisor
James M. Allan, Lead Project Consultant
Nanette Bulla, Project Consultant
Steven A. Goodman, Project Consultant
Kristopher A. Scott, Project Editor
Tessa Wright, Project Editor
Monica Vaught, Project Editor

Background: Because it identified an important educational trend, this project was a specially funded initiative for FY 1999. Each year, more and more school systems will deliver their assessments via computer. If we are to ensure that students with visual disabilities are not excluded from educational experiences, it is crucial to develop and provide the field with a set of guidelines for computer-based testing.

Initial work during FY 1999 consisted of initiating an investigation of the status of computer-based testing of students in school systems nationwide. A new Test and Assessment Project Leader joined the Department of Educational Research in January 2000. The Project Leader contacted test publishers and reviewed demonstration software for accessibility, subsequently meeting with the Project Advisors to discuss problems with commercially available software and the possible applicability of *Teacher's Pet*TM to this

project. An outline of sections and a tentative timeline for the project were drafted. Three expert consultants in the areas of technology, blindness, and low vision were contacted and agreed to join the Project Team. The consultants wrote drafts of the guidelines sections.

In 2001, the technical investigation and drafting of sections of the Guidelines continued. An evaluation form was developed, reviewed by the survey committee, and revised as needed. Six professional reviewers, representative of the target audience, were chosen for their expertise in the areas of technology, test design, and testing practices for visually impaired students/clients. The review was made available online in order to provide timely and totally accessible review documents and forms. Final reviews of the document were received in-house by July 31, 2001.

Since results of field reviews indicated some structural problems, extensive reorganization of the document was outlined for better accessibility. Editing of the document was begun and continued through most of the second and third quarters of FY 2002. Cover design, layout, and production specifications were completed.

In connection with this project, the Project Leader attended a Conference on Large-Scale Assessment, at the Council of Chief State School Officers (CCSSO), held in Palm Desert, California, June 22-26, 2002. A total of 12 sessions at the conference were devoted to discussion of states' implementation of computer-based testing. Important statistics on this trend were gathered at the conference: More than 12 states or individual school systems have piloted or implemented a computerized version of their exams.

The Project Leader and project advisor, Larry Skutchan, attended several meetings of the Universal Design for Learning Workgroup of the Kentucky Department of Education's Exceptional Children's Services. Both Larry and Barbara collaborated with the Kentucky group to ensure accessibility for the upcoming trial of Kentucky's Online Assessment Test, CATS Online, in Fall 2002.

Work During FY 2003: The Project Leader and project editor presented a poster session on Test Access at the APH annual meeting, October 2003. In the new year, the Project Leader and James Allan, lead project consultant, made a poster presentation at the Association of Test Publisher's (ATP) Conference on Technology in Testing, Amelia Island, Florida, February 24-26, 2003. Response to the information was excellent.

With passage of No Child Left Behind, the decision was made to offer *Test Access: Guidelines for Computer Administered Testing* as a free download on the APH web site. Last edits were completed in March 2003 and a final check of electronic citations and links was done just prior to going to press. An accessible HTML file was formatted first and placed on the web site in April, with a braille-ready version following in May, and a printable PDF file posted in June. Finally, Larry Skutchan's technical group worked with the APH recording studio to create a DAISY digital talking book format. Go to the following URL to download the document: <http://www.aph.org/tc/index.html>.

Test and Assessment Needs (Continuing)

Purpose: To determine the needs of the field with regard to testing and assessing students who are blind or visually impaired.

Project Staff: Barbara W. Henderson, Project Leader
Debbie Willis, Project Advisor
Carol Roderick, Project Assistant

Work During FY 2003: The Project Leader discussed results of a short survey completed by the Deafblind Focus group with Sandi Baker, APH Field Services Representative, and Tristan Pierce, Multiple Disabilities Project Leader. Acting as a team, they researched currently available training videos and DVDs for possible sale through the APH Catalog.

The Project Leader collaborated with Tina Tucker at the National Foundation for the Blind (NFB) on Adult Assessment Issues. As a new member of the Bridging the Gap training group, Barbara provided workshop materials on adult assessment tools available in accessible formats for the National Association for Adults with Special Learning Needs (NAASLN) Conference in Columbus, Ohio. Additionally, the Project Leader networked with Comprehensive Adult Student Assessment System (CASAS) staff on needs of adult ESL learners with visual impairments and large print guidelines.

Work Planned for FY 2004: The Project Leader will facilitate a workshop on *Challenges and Solutions in Assessment of Adult Students* at the Bridging the Gap Leadership Summit in Atlanta, Georgia, October 31-November 1, 2003.

A series of training sessions for test administrators will be kicked off at APH Annual Meeting 2003. Carol Allman, Ph.D. and Barbara Henderson will present a product training workshop on *Using Brigance Green Materials*. Some short training videos will be produced to accompany these assessment training workshops.

Finally, additional online assessment surveys will be posted on the APH web site in order to get a fresh perspective on the current needs of Visual Impairment professionals.

Woodcock-Johnson III Tests of Achievement: **Student Braille Edition** (New)

Purpose: To make widely used Psychoeducational Assessment materials available in braille.

Project Staff: Barbara W. Henderson, Project Leader/Editor

Lynne Jaffe, Ph.D., Project Consultant
Carol Anne Evans, M.Ed., Project Consultant
Monica Coffey, Project Assistant-Editor

Background: The *Woodcock-Johnson III (WJ-III) Tests of Achievement* are widely known and used to assess academic strengths and weaknesses in children and adults. Practitioners in the field of visual impairment have long expressed their desire to see APH do an adaptation of *WJ-III* for the braille reader. Identified by focus groups and in assessment surveys as one of the top three needs alongside *Brigance Green* (CIBS-R) and Wechsler Individual Achievement Test (WIAT), *WJ-III* was brought forward as a project in 2001 in preparation for publication of the 2001 revision. Permission of the Riverside Publishing was sought and two expert consultants were hired: Lynne Jaffe, Ph.D., Learning Disabilities Specialist, Technical Assistance to Schools Assessment Team, Arizona Schools for the Deaf and Blind and Carol Anne Evans, M.Ed., School Psychologist, Davis School District, Farmington, Utah.

Work During FY 2003: The Project Leader and the consultants met in early FY 2003 to plan the project timeline. Editing of the standard battery was all but completed during the weekend meeting. Editing of the extended battery was completed in the following two months. Work was outlined for the test administrator's manual. A project assistant-editor was assigned and work was begun on the markups for braille transcription.

Work Planned for FY 2004: Work on the test administrator's manual will continue. Completion of product specifications will move the project toward production of a product prototype in Winter 2004 with field testing to follow.

Research Department Activities FY 2003

Ralph E. Bartley
Director

Adult Life

Mary T. (Terrie) Terlau

Adult Life Needs (Ongoing)

Purpose: To develop adult life products and services that are affordable, user-friendly, consumer driven and that address the diverse needs of the blind and visually impaired population.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Carol Roderick, Project Assistant

Background: Product development in the area of Adult Life was initiated at APH in the summer of 1998. The first products derived specifically from this effort were made available during FY 1999. Product research, along with consumer and professional networking have continued to characterize the development of products for adults.

Work During FY 2003: Information about APH's available adult life products was presented to the rehabilitation and consumer communities. The 2002 conference of the Mid-America Conference of Rehabilitation Teachers and the Association of Southeastern Rehabilitation Teachers was hosted by APH in Louisville on November 14-16. At this conference, approximately forty rehabilitation teachers, orientation and mobility specialists, and other interested professionals learned about adult life products and applications of other APH products and services to the needs of blind and visually impaired adults. APH products and services useful to visually impaired senior citizens were highlighted in a presentation by the Adult Life Project Leader at the 2003 Joint Conference of the National Council on the Aging and the American Society on Aging held on March 13-16 in Chicago, Illinois. The Project Leader disseminated information about APH products and research and developed contacts with potential collaborators and consultants at the Vision Loss in the 21st Century Symposium sponsored by the American Foundation for the Blind and the Foundation for the Junior Blind held February 19-21 in Beverly Hills, California and at the Conference of the National Association for Adults with Special Learning Needs held March 15-18 in Columbus, Ohio.

Product concepts derived from consumer and professional focus groups were explored and refined. Feasibility and design research was initiated on product concepts identified as important by Orientation and Mobility and Adult Consumer focus groups. Two on-line surveys were conducted to evaluate and refine product concepts proposed by professionals. Several products important to the field were brought through field review, revision, and production phases.

Work Planned for FY 2004: Investigation and development of new products for adults will continue. The Project Leader will continue to seek input from the field by networking with APH Ex Officio Trustees and consumer and professional groups. Focus groups will be conducted as needed.

Braille DateBook (Continued)

Purpose: To provide a braille monthly calendar and appointment-keeping system that is small, durable, and easy-to-use with a slate and stylus or a braillewriter.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Fred Gissoni, Project Advisor
Frank Hayden, Project Assistant
David McGee, Project Assistant
Bisig Impact Group, Graphic Design

Background: At this time, a braille calendar/planner that is attractive, durable, and easy-to-use with a braillewriter or a slate and stylus is not available. Although many blind persons use electronic note takers or digital recorders to store appointment information, such devices are often prohibitively expensive and information is not available when batteries die.

Many blind consumers and professionals in the field have expressed the need for a hard-copy appointment book with a set of specific features that are incorporated into the *Braille DateBook*. The padded vinyl binder has a closure to protect planner pages, pockets to hold a slate and stylus, and sturdy rings to hold 4" by 6" braille sheets. Other materials include one year of monthly calendar pages, braille filler paper, and tabs for dividing the binder into customizable sections. The monthly calendar pages are tabbed so that the appointment pages can be stored behind the appropriate month and easily located by reading the month abbreviation on the tab. Braille and print guide books describe how to use these materials to create appointment books, planners, address books, homework assignment books, family events calendars, and combinations of these.

Work During FY 2003: An early failure in the binder closure has been corrected by the binder manufacturers for the 50 prototype binders. Calendars, tab sheets, and filler paper were produced for 50 kits.

Forty-five *Braille DateBooks* and evaluation materials were sent to 37 adults and six teachers (for eight students) in 26 states and the District of Columbia. Completed materials were received from 29 adults and three teachers for three students from 20 states and the District of Columbia.

Field review results indicated that the planner system was very effective; reviewers reported that it was easy to locate appointment pages behind calendar month tabs and to find addresses and other information in customized tab sections. Reviewers reported that the material used in the stylus attachment and binder closure came off of the binder and that the slate pocket and small storage pocket were too tight. As a result of field reviews, the closure material was sewn to the binder cover, a stylus pocket was used instead of the

former attachment, the slate pocket was made wider, and the small storage pocket was eliminated. Specifications were developed, tooling was completed, and a production schedule was established.

Work Planned for FY 2004: Production is expected to be complete and the *Braille DateBook* is expected to be available for purchase near the beginning of FY 2004.

EZ Track Financial Record Keeper (Continued)

Purpose: The *Financial Record Keeper* offers adults with low vision a system for storing and easily locating personal financial information.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Frank Hayden, Manufacturing Specialist
David McGee, Manufacturing Specialist
Bisig Impact Group, Graphic Design
Tessa Wright, Project Assistant
Ann Travis, Project Assistant

Background: This product is part of the *EZ Track (formerly MasterPlan)* series of low vision organizational tools. Consumers and professionals responded very favorably to the *EZ Track* series and requested that a tool for organizing and accessing financial information be included in the series. Prototype development, field review, and revisions based on field review findings have been completed.

Work During FY 2003: Final copy editing, graphic design changes, specification development, and new graphic layouts were completed. Production of *Financial Record Keeper* pages was completed.

Work Planned for FY 2004: Production of the product guidebook is expected to be completed and the product is anticipated to be available for sale early in FY 2004.

Find It Object Locator (Discontinued)

Purpose: To develop a product to help persons with visual impairments locate lost objects, re-locate landmarks, and enhance sound localization skills.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Frank Hayden, Manufacturing Specialist
James Robinson, Technical Assistant

Background: Persons who are blind or visually impaired cannot scan the environment to locate lost objects or landmarks. When a frequently used object - such as a key, handbag, or backpack - becomes lost, time and energy are required to relocate the item. When a blind person needs to relocate their chair in a crowded meeting room or restaurant, sighted assistance is frequently required. Consumers at a focus group conducted during the 2002 National Federation of the Blind Convention in Louisville, Kentucky expressed a need for a product that would help them locate lost objects and landmarks.

Some persons with visual impairments use wireless door chimes or personal pagers as object locators. A transmitter, triggered by a button push, sends a signal that causes the receiver unit to chime. If the receiver is attached to a frequently used object or left at the point to which a person wishes to return, the tone can guide the person to the desired location. During FY 2002, when development of this product began, the available devices allowed one transmitter to trigger only one receiver. Consequently, a person could not use such devices to find more than one object at a time.

The *Find It Object Locator* utilized design principles characteristic of wireless door chimes or personal pagers. However, its transmitter had the capacity to independently trigger one of several receivers so that more than one object or location could be found. During FY 2002, initial prototype features were explored and functional specifications were developed.

Work During FY 2003: The project's technical assistant developed several early prototype models and design plans for complete prototype were initiated. Early in FY 2003, a new product featuring a single transmitter and multiple, selectable receivers appeared in the general market place. Examination and review of this product demonstrated that it could be used to locate multiple objects. Because a main stream company was producing a product with much of the functionality proposed for *the Find It Object Locator*, the development of this product by APH was abandoned.

Work Planned for FY 2004: This product has been dropped from development because a similar product appeared in the main stream market place. No further work on this product is anticipated.

Label Kit (Continued)

Purpose: To provide adults who have lost vision, information about how to identify objects and materials in their environment, particularly household items, and a tool kit to assist in labeling.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Lisa-Anne Mowerson, Project Consultant

Background: An Independent Living Specialist in Kentucky suggested that APH create a set of large print labels for canned foods and pantry items. Input from a focus group of rehabilitation teachers led to the expansion of this product to include a consumer-oriented book that will provide guidance in organizational techniques as well as labeling. A labeling tool kit will also be developed to accompany the book. These materials will help visually impaired adults who are unable to access rehabilitation teaching services to understand and apply organizational and labeling principles. Teachers can also use these materials with students whom they see infrequently.

Work During FY 2003: Ms. Mowerson, project consultant, has completed a first draft of the *Labeling Book* content. Adult learning strategies utilized in the book are being reviewed and expanded by Ms. Mowerson and the Project Leader. Second drafts of book chapters that incorporate case study and directive learning strategies have been developed. Investigation of materials to be included in a *Labeling Tool Kit* has been undertaken.

Work Planned for FY 2004: The writing, field review, and revision of the *Labeling Book* prototype and accompanying Tool Kit will be completed.

Money Talks (Continued)

Purpose: To provide a Windows-based bank account management software package that will be easily accessible to blind and visually impaired persons.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Larry Skutchan, Project Advisor
Rob Meredith, Programmer
Bisig Impact Group, Graphic Design

Background: Keeping bank account records on a computer provides a reliable method of maintaining check registers and account balances. However, main stream bank account management software presents some access obstacles to experienced visually impaired computer users and is not accessible to persons without specialized training and expensive access software. *Money Talks* is designed to perform the full range of account management functions needed by blind and visually impaired persons. It will be fully accessible, with speech and large print output built into the program itself. This program is also designed to be intuitive and user-friendly for persons with little or no computer experience.

Work During FY 2003: Results of extensive research on formats and standards for personal and business checks and on printers that support the use of small media indicate that it is now possible to fill in fields on checks from a personal check book electronically.

Money Talks will support the ability to fill in information on personal checks. This feature will enable blind persons to write checks independently.

Artwork for the product has been located. Plans for the look and functionality of the opening screen have been made.

Work Planned for FY 2004: Development of remaining program features, completion of documentation, field review, and final revisions are anticipated. Quota approval will be sought.

Nonverbal Communication Curriculum (Continued)

Purpose: To develop an instructional curriculum that will help adults who are blind or visually impaired understand and integrate nonverbal communication skills into their daily lives.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Karen McCulloh, Project Consultant

Background: The ability to communicate nonverbally is an essential skill for successful functioning in occupational and interpersonal situations. Because learning about and producing nonverbal communication is derived from visual modeling and is based on availability of visual information, persons with visual impairments may experience difficulties in both understanding the meaning of nonverbal behavior and producing understandable nonverbal communications. They may need specific educational experiences to help them understand what is going on around them and to develop positive methods of nonverbal communication.

This project will result in a curriculum that will help people who are visually impaired learn how to integrate nonverbal communication skills into their daily interactions. Topics such as gestures, posture, social distance, appearance, voice intonations, and facial expressions will be covered. This curriculum will help blind or visually impaired individuals become more successful within interpersonal communication situations such as job interviews, professional meetings, advocacy situations, and everyday social interactions.

Work During FY 2003: Ms. McCulloh proposed an outline of materials and workshops for use in rehabilitation and education settings. Communications with Ms. McCulloh have continued and several contract issues have been resolved.

Work Planned for FY 2004: The development of an effective consulting contract and creation of initial draft of text are anticipated.

Orientation and Mobility Family Book (New)

Purpose: To provide orientation and mobility specialists with an interactive CD-ROM tool to create individualized Orientation & Mobility (O&M) progress booklets for a student and his/her family.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Fabiana Perla, Project Consultant
Betsy O'Donnell, Project Consultant
Brian Dougherty, Graphic Designer
Larry Skutchan, Software Engineer
John Hedges, Programmer

Background: In order for a student with visual impairments to integrate orientation and mobility skills into his/her daily life, the student must use these skills in a variety of home and school settings. The more information families have about their child's orientation and mobility needs and about the skills that their child is currently learning, the more they can encourage and support their child's use of orientation and mobility skills at home and in the community. Orientation and mobility specialists attempt to establish and maintain communication with their students' families. However, large case loads and busy family schedules do not allow time for individualized communication about a number of essential topics. Many orientation and mobility specialists and the families they serve could benefit from an easy-to-use, standardized method of communication about a child's orientation and mobility skills and needs.

Betsy O'Donnell and Fabiana Perla, experienced orientation and mobility specialists, developed and field tested an *Orientation and Mobility Family Booklet*. This booklet provided information about the purpose of orientation and mobility and the types of skills taught. It also included sections to be customized according to the child's eye condition, the functional implications of this condition, the orientation and mobility skills that the child is learning, and the child's current level of mastery of these skills. Additional sections explained the important role of the family in utilizing teachable moments and participating in various types of games and activities to enhance development of particular skills.

Ms. O'Donnell and Ms. Perla submitted their booklet and a user's guide for Orientation and Mobility Specialists to the American Printing House for the Blind for consideration as a potential product. After discussions with APH staff, it was decided to produce a software package on CD-ROM that would guide an orientation and mobility specialist through the process of creating a book for a particular student and her/his family.

The CD-ROM will include information that an instructor can choose to match a particular student's situation. An instructor will be able to select eye conditions and easy-to-understand definitions from a pull-down list. Orientation and mobility activities to be

done with family members at home will also be selectable according to the age or developmental level of the child and the type of environment involved. A Spanish version of these materials will also be provided on the CD.

Work During FY 2003: Contracts were developed and finalized with Ms. O'Donnell and Ms. Perla. First drafts of screen layouts for the CD-ROM were submitted by these consultants. Initial meetings with project staff indicated that software could fulfill the following set of desired criteria: data bases of selectable eye condition definitions and orientation and mobility activities could be included; appropriate links between booklet sections, directions for section completion, and examples of completed sections could be created; a copy of a particular student's book could be saved and updated at a later time; and final copies of the book could be produced in braille, large print, or standard print.

Work Planned for FY 2004: The screen-by-screen outline of the book and text for eye condition definitions and orientation and mobility family activities will be developed. Artwork will be selected and graphics layout will be completed. Programming will begin. It is anticipated that prototype development will be completed and that field testing will be initiated. Quota approval will be sought.

Parenting Book (Continued)

Purpose: To provide visually impaired parents with support and information about parenting techniques that have been effective for other visually impaired parents.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Janet Ingber, Project Consultant
Kevin E O'Connor, Project Consultant
Deborah Kendrick, Project Consultant
Ann Travis, Project Assistant

Background: Janet Ingber, a blind mother, submitted a draft outline and three chapters of a parenting book based on interviews with seventeen effective parents who were visually impaired. Research conducted at APH supported Janet's finding that very little information was available for blind parents regarding issues related to visual impairment and parenting. The need for an informational parenting book was further assessed through a survey of professionals in the field of visual impairment and blindness. Survey results indicated that: training was not available for professionals in the area of parenting and visual impairment; there were a significant number of blind parents who could have benefited from information related to blindness and parenting; and a self-help informational book could maximally benefit many such parents or parents-to-be. Of particular concern among survey respondents was the need for support and information to

counteract the negative stereotypes about blindness such as the belief that persons with visual impairments could not be effective parents.

To meet the need for accurate information and support for parents with visual impairments, the development of an expanded version of Janet Ingber's *Parenting Book* has been undertaken. Information provided in the book will be obtained from telephone interviews with effective parents with visual impairments.

It has been determined that Ms. Ingber will conduct telephone interviews with approximately 60 parents, transcribe interview data into a data base, and write the *Parenting Book* based on results of parent interviews. Kevin O'Connor, a parenting expert, will read book drafts and suggest any revisions necessary to ensure that the book reflects current promising practices in the parenting field. Deborah Kendrick, author and journalist, will suggest revisions based on her expert knowledge of the field of visual impairment and parenting. In accord with this project plan, drafts of the following documents have been developed: a *Parenting Project Description* pamphlet, a *Participant Consent Form*, a *Parent Information Questionnaire*, and the *Telephone Interview Script*.

Work During FY 2003: A Microsoft Access database was developed to record, store, and manipulate information to be obtained from questionnaires and phone interviews. Parent volunteers were recruited through APH Ex Officio Trustees, the APH monthly newsletter, e-mail list announcements, contacts with staff and/or relevant committees of the American Council of the Blind and the National Federation of the Blind, and word of mouth. To participate in this project, parents must have raised at least one child to age four when the parent was legally blind. They also have been selected because of their interest in and commitment to parenting and because of their desire to share what they have learned with other parents. Attempts have been made to acquire a sample that is regionally representative and in which two-thirds of the parents have at least one child still living at home. Approximately 85 parents have been contacted by telephone. Fifty-five have returned the Parenting Information Questionnaire and a signed Consent Form.

Work Planned for FY 2004: After final revisions of the Access data base are completed, material from Parenting Information Questionnaires will be entered and telephone interviews with parents will be completed. Interview data will be entered into the data base and first draft writing of book chapters will begin.

Printing Guide (New)

Purpose: To develop teaching materials and printing templates to assist persons who are blind to learn to print legible capital letters according to positions of the braille dots in a cell.

Project Staff: Mary T. (Terrie) Terlau, Project Leader

Monica Vaught, Project Co-leader
Linda Ray, Project Consultant
Frank Hayden, Manufacturing Specialist
Tom Poppe, Model Maker
Bernadette Mudd, Graphic Designer

Background: Although computers increasingly are being used as a means of written communication on the job and in social and recreational life, production of legible written communication still remains an essential skill. Jotting notes to colleagues, writing a quick comment on a page of printed material, leaving a note on the refrigerator for a family member, and filling in information on a check while shopping are only a few of the tasks that are accomplished more easily with a pen than with a computer.

Some congenitally blind persons have developed legible script and/or print styles. However, many adults who did not have functional vision during primary and elementary grades have not learned to write legible signatures and do not have the ability to produce print or script letters that sighted persons can read.

Ms. Linda Ray, a teacher of the visually impaired, submitted one print teaching method for consideration. With this method, students are taught to shape block print capital letters by connecting dot positions within a braille cell for each letter. Additionally, students are taught to print within a template of lines of rectangular openings. By using this template, cell boundaries can be detected when printing, print remains constant in size, and characters do not drift into one another.

Work During FY 2003: Early research indicated that, though braille dot positions had been used to teach both printing and script writing throughout the blindness field, teaching curricula and materials had been developed primarily for script and not for print. Print samples from persons using Ms. Ray's print teaching method and from persons who had been taught to print using a variation on this method were examined. Preliminary data indicated that, with several significant exceptions, the connecting dots method of print teaching in combination with a printing template resulted in very readable block print. However, when printed with this method, several letters were indistinguishable or ambiguous. It was deemed desirable to develop a system that could teach curves in "Bs" and "Os" so that they could be distinguished from "8s" and "Ds" respectively. Based on results of initial print samples, it was also deemed necessary to develop additional teaching materials for some letters with diagonal lines. Tracing boards were developed to help students acquire muscle memory for printing some curved and diagonal characters. Preliminary findings suggested that an alternative process might produce a more effective tracing board.

Printing templates were constructed and tested for two cell sizes. A template of lines containing large cells was developed for beginners and a template containing lines of small cells was developed for advanced students. Cell sizes were adjusted as a result of feedback from students and teachers who used these materials.

Work Planned for FY 2004: More effective tracing boards for some curved and diagonal letters will be constructed. Teacher and student guidebooks will be written. Field review and revisions are expected to be completed. Quota approval will be sought.

Sewing without Sight (New)

Purpose: To produce an up-to-date, user-friendly instruction book for hand and machine sewing, using techniques that can be mastered by blind students with the help of a rehabilitation teacher or on their own.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Shireen Irvine Perry, Project Consultant

Background: Mike Cole, Administrator of the Orientation Center for the Blind in Albany, California and Ex Officio Trustee of the American Printing House for the Blind, noted that APH's only instructional book for sewing was outdated. He indicated that the sewing instructor at the Orientation Center could provide material for an up-to-date book that could be appropriate for use by visually impaired consumers in center-based and home-based rehabilitation programs or without rehabilitation teacher support.

Work During FY 2003: Preliminary discussions of book content were initiated with the project consultant, a chapter outline was proposed, and contract negotiations began.

Work Planned for FY 2004: After a contract has been developed and signed, the consultant will produce a first draft of the book. Initial edits will be completed and field review sites and reviewers will be located.

Student Electronic Mobility Aid (new)

Purpose: To develop a small, user-friendly, and reasonably sophisticated Electronic Mobility Aid that will provide a blind student with information about obstacles, environmental features, and landmarks that are not as easily discernable when using the long white cane alone.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Bernadette Mudd, Graphic Designer

Background: On June 23-25 of 2002, a focus group comprised of nine orientation and mobility specialists from eight states met at the American Printing House for the Blind to delineate product needs in the Orientation & Mobility (O&M) field and to derive a list of

product concepts that APH might develop to meet these needs. High on the list of product concepts was an Electronic Mobility Aid that was small and user-friendly and that could introduce students from a young age to the benefits of acquiring environmental information that is not available with a cane alone.

Work During FY 2003: Desirable features in an Electronic Mobility Aid have been delineated. On-the-market Electronic Mobility Aids have been obtained and evaluated through on-line surveys, telephone interviews with experts, examination of videotapes of travelers using such aids, and hands-on examination by local orientation and mobility specialists and blind travelers. Discussions with product developer/distributors indicated that modifications might be possible in order to develop a product that would contain features desirable in an APH student electronic mobility aid.

Work Planned for FY 2004: Evaluations of available aids will be completed and a decision will be finalized regarding prototype development. Prototype units and guide books are expected to be available for field testing by the end of 2004.

Transition Tote System, Revised (Continued)

Purpose: To update materials and resource lists in a curriculum that teaches skills necessary for successful entry into the world of work.

Project Staff: Mary T. (Terrie) Terlau, Project Leader

Background: In light of the high unemployment rates for people who are blind or visually impaired, the 1993 Educational Research and Development Committee of the American Printing House for the Blind strongly recommended that APH develop career preparation materials. The *Transition Tote System* was produced to meet this need. *Transition Tote* materials provided instruction in the following skill areas: personal organization, self-awareness, self-advocacy, work exploration, job seeking, and job keeping. An extensive list of important educational and vocational resources was also included. The Tote Case was developed to provide an organizational system for storing job-search materials and to serve as a carrying case for braille and large print media, cassette recorders, note takers, and laptops.

Revision of the *Transition Tote System* is needed because its resource sections have become outdated and because its carrying case has not functioned as originally intended. Resource information was collected during 1996 and 1997. Major changes in assistive technology, vendor contact information, and service delivery systems have occurred since that time and need to be incorporated into resource lists. The *Transition Tote Case* is not sturdy enough to transport electronic equipment, note takers, and computers safely.

Work During FY 2003: The current model of the *Transition Tote Case* was re-

stocked from a new vendor. The re-stocked cases are made of a more appealing material and display appropriate stitching and trim. These cases do not resolve issues pertaining to safe transport of electronic equipment, but they do present a more attractive appearance.

Changes to be considered in a new version of the Tote Case were discussed in an informal meeting with a developer of the original *Transition Tote* project. An additional text section was also discussed. Alterations to case design and drafting of a new section will be considered when the desired consultant has free time to pursue work on this project.

Work Planned for FY 2004: Revisions to the resource list, a draft of a new section, and re-design of the *Transition Tote Case* will be undertaken.

Art

Staff

Textured Paper Collection (New)

Purpose: To produce a package of colored paper and vinyl sheets with distinctive textures that can be used in making tactile graphics, worksheets, artwork, and labels. An outside vendor will provide some sheets and others will be created in-house. Most sheets will have peel-and-stick adhesive, for those that do not, an adhesive will be provided in the kit. The audience is teachers and parents of visually impaired students, and visually impaired students themselves from elementary age through adult. The users will cut shapes from the textured sheets and apply them where desired.

Project Staff: Fred Otto, Project Co-Leader
Karen Poppe, Project Co-Leader
Tom Poppe, Model Maker

Background: Over time, project developers and the model maker at APH have created numerous distinct textures by embossing or thermoforming paper or vinyl sheets. Recognizing that these have benefits for blind readers, project staff began to assemble a collection of the textures and evaluate them for discriminability, durability, pleasantness to the touch, and other factors. At the same time, staff were in contact with Lois Lawrie of Tactile Colour Communications about carrying some of her colored, textured adhesive sheets as a complementary part of the APH set of materials.

Work done during FY 2003: PARC approved a request to begin active development of this product. Project staff experimented with various tools, media, and production methods and created samples of about 20 textures. Informal tests were done in-house to gauge people's reactions to the textures in terms of discriminability and tactual appeal. The number of possibilities was narrowed to five produced by APH and five purchased from Tactile Colours for purposes of field testing.

Staff also weighed the benefits and costs of adding adhesive to the sheets made in-house versus supplying a separate adhesive for users to apply.

Field testing was conducted at nine sites over the summer, including programs in Maryland, Kansas, Nebraska, Utah, New York, Louisiana, Guam, and Australia.

Work Planned for FY 2004: Depending on the results of the summer field evaluation, a further round of evaluations may be conducted at the beginning of the school year. Revisions will be made as needed, the packaging and graphic presentation of the product established, and final product documentation written. The project will be completed and scheduled for production.

Time for Art (Completed)

Purpose: To create a teacher's manual that includes guidelines and instructions to teach art activities that are especially appropriate for students who are visually impaired.

Project Staff: Tristan Pierce, Co-Project Leader
Suzette Wright, Co-Project Leader

Background: In September 1999, Jean Randles, Art Teacher at the Kentucky School for the Blind, recommended this art manual, written by Gail Showalter, to the APH Product Advisory and Review Committee, and it was accepted. The art manual is targeted to elementary school teachers who may have a child with a visual impairment in their classroom and need art activities that both sighted and visually impaired children can enjoy.

Work During FY 2003: Product was made available for sale.

Braille

Eleanor Pester

Alphabetic Braille and Contracted (ABC) Braille Study (Continuing)

Purpose: The *ABC Braille Study* is a five-year exploration of literacy skills and experiences of children who are initially taught contracted braille and those initially taught uncontracted braille. Children in the United States and Canada are enrolled.

Core Team: For the *ABC Braille Study*, Dr. Anne Corn functions as the principal investigator. Dr. Alan Koenig and Dr. Sharon Sacks are Research Team Leaders. Other observers and researchers include: Dr. Chris Craig, Ms. Frances Mary D'Andrea, Dr. Jane Erin, Ms. Liz Barclay, Dr. Cay Holbrook, Ms. Julia Ituarte, Ms. Stephanie Anne Herlich, Dr. Diane Wormsley, Ms. Liz Barclay, and Ms. Debbie Sitar, Dr. Robert Wall is the statistician for the study. Ms. Eleanor Pester and Dr. Ralph Bartley represent the APH on the study group.

Background: The *Alphabetic Braille and Contracted Braille Study (ABC Braille Study)* is a five-year study of children who are braille readers. The *ABC Braille Study* explores the development of literacy skills and literacy experiences of children who initially learn contracted braille and those who initially learn uncontracted braille. At the time of the 2004 Association for Education and Rehabilitation for the Blind and Visually Impaired (AER) Conference, the study will be completing its second year of observations, interviews, and assessments.

While this study seeks to develop guidance for teachers of students with visual impairments with regard to initial instruction in braille, it also provides the first in-depth look at how young blind children are learning to read, write, and spell.

Children in the study reside in the U.S. and Canada and attend special schools and local education agencies. They are enrolled in the study in either pre-kindergarten or kindergarten and will be followed up to fourth grade.

This study is also the first time a consortium of seven universities, two organizations, a special school and a local education agency have joined forces to conduct research.

Work During FY 2003: This has been a year of planning, organizing, and implementation. The June 15, 2003 meeting of the core team, hosted by the California School for the Blind, resulted in the following summary of the observations and progress made during the FY 2003 School year:

- Twenty-one (21) students were in the study for year one and these students will continue to be followed in year two.
- A lengthy and detailed discussion was conducted on the data fields (over 200)

found in the Statistical Program for the Social Sciences (SPSS). The discussions focused on instructional methodologies and materials. Proposals were made and accepted that will result in improved data collection and an improved clarity of how children are being instructed in braille.

- A presentation was made to the Canadian National Institute for the Blind
- Strategies were discussed on how to increase the sample size in the future.
- Letters of appreciation were sent to parents, teachers, and administrators.
- And finally, the Core Team is unanimous in the belief that this study has the potential to be a major influence in the area of the instruction of children who are blind.

Work planned for FY 2004: A writing analysis of the composition and structure of writing is being added to the research protocol - Dr. Jane Erin will be leading that part of the study.

Children will be enrolled into the study for the first three years and researchers will continue with their observations and assessments until the completion of the five years for which the study is funded. This is a change from the original plan but observations during the first year indicate this is a better way to obtain robust data. It is anticipated that there will be between 20 and 30 children in each group (contracted and uncontracted).

At the time of writing, analysis is being conducted of the first year's observations, literacy assessments, and hand movements of the children. A first report on the study's findings will be presented in December 2003 at the conference, Getting In Touch with Literacy, Vancouver.

Annotated Bibliography on Hand Skills for Reading Efficiency (Continuing)

Purpose: To consolidate research on hand skills for braille reading which was being reviewed for several braille reading projects and to make it available for easy reference at APH and on the APH Website.

Project Staff: Tessa Wright, Project Leader
Monica Coffey, Project Assistant
Eleanor Pester, Project Advisor
Inge Formenti, Research Librarian

Background: While reviewing literature for the braille reading programs under development at APH, this was one of the topics that seemed to garner special interest for beginning reading instruction. By annotating the articles, there will be a permanent record of the articles reviewed for these projects. This information will be readily available for

staff use later, and by putting it up on the APH Website, this information will be available for others who might also be interested in researching this topic.

Work began on this project soon after Kris Scott finished a similar bibliography on Contracted and Uncontracted Braille Research that was posted on the APH Web Site in 2002. Monica Coffey, who was a research assistant at the time, pulled together much of the research for this bibliography. Later in 2002, when Monica joined the Accessible Tests Department, she passed the work that she had done on to Tessa Wright who found additional sources, wrote the annotations, and organized the bibliography. Eleanor Pester and Inge Formenti made suggestions from time to time about articles that should be included in the bibliography.

Work During FY 2003: Tessa Wright completed a draft of the bibliography, which was reviewed by Eleanor Pester and Inge Formenti.

Work Planned for FY 2004: Final revisions and additions will be made to the bibliography, and it will be posted on the APH Website.

Braille Labels and Sheets (New)

Purpose: To provide clear adhesive labels and sheets for a variety of braille needs for students, teachers, parents, and adult blind consumers.

Project Staff: Karen J. Poppe, Project Leader/Product Developer

Background: The Project Leader has received numerous requests from the field to provide blank sheets and peel-off labels for a variety of braille tasks such as creating file folder labels, adapting print storybooks, labeling household items, adapting appliances, and so forth. Having located and utilized adhesive, kiss-cut material in past for the *Feel 'n Peel Stickers*, the Project Leader recognized the product request as one that could be easily addressed and made available in a short timeframe.

Work During FY 2003: In spring of 2003, the Project Leader formally submitted the idea of providing clear-adhesive labels and sheets for braille purposes to the Product Advisory and Review Committee (PARC). After approval from the in-house committee to proceed with product development, the Project Leader provided various samples and thickness of clear vinyl to totally blind adults for initial review. Suggestions for ideal sizes of labels were garnered as well. Provided validation that the current vinyl used for the *Feel 'n Peel Stickers* was ideal for both braille labeling via a braillewriter and a slate and stylus, the Project Leader proceeded to mock up various styles and formats of labels. Unlike other types of labels currently available on the market, these new labels will be provided in a manner that totally blind users will be able to discern the end of one label from the beginning of the next so that they can independently create and apply brailled labels.

The Project Leader conducted early discussions with outside vendors regarding the type of label configurations expected and the die-cutting processes available for achieving these unique formats.

Work Planned for FY 2004: The product will be placed on the active timeline and prototypes will be generated for field testing purposes. Once the ideal size(s) of labels are known via reviewers' evaluative comments, the final tooling and product specifications will be prepared. The Project Leader will monitor the quality of the initial production runs.

Braille Code Recognition Program (New)

Purpose: To increase braille reading efficiency through contraction recognition training and testing.

Project Staff: Eleanor Pester, Project Leader
Ann Travis, Project Co-Leader

Background: This is a revision of a product that has been in our catalog since 1965. It is based on research that still seems valid, but the materials are geared toward residential schools. It is sold with a Teachers' Kit for ten teachers and a Students' Kit for five. It is only available in very small print. The goal of this revision is to keep the student materials the same but make them available for individual students, and to make a straight-forward teacher's edition, in both braille and a more suitable print, to be used with the student materials.

Work During FY 2003: Both the Product Advisory and Review Committee (PARC) and Product Evaluation Team (PET) approved this project for development. The old materials were reviewed. Plans are being made for the development of the product.

Work Planned for FY 2004: Materials will be edited, reviewed, and prepared for production.

Braille Literacy for Older Blind Students (Continuing)

Purpose: To develop a set of braille materials to introduce older blind students both to the skills required for literacy and to Grade 2 Braille.

Project Staff: Eleanor Pester, Project Leader
Betty Modaressi, Directing Editor/Consultant
Diana Myers, Writer

Carol Roderick, Project Assistant

Background: As braille bills have become more prevalent and there has been an increased emphasis on the importance of braille literacy, older blind students are being identified who have never fully learned the important skills of reading and writing. Although there are a number of good programs available for teaching braille to adults and even a few for adolescents, all of them are built on the premise that the students already have developed the skills necessary for reading and that they are just learning a new code. *Patterns: The Primary Braille Reading Program*, developed at the American Printing House for the Blind, has been very successful at teaching children to read braille, but *Patterns* does not meet the needs of older students whose interests and learning styles are different from children's. Therefore, a new program needs to be developed to better meet the needs of older blind students who have poor or no reading and writing skills.

Articles, research studies, and instructional materials on adult literacy, methods of teaching adult literacy, braille reading and writing, hand movements for braille reading, and methods of increasing reading rates for braille reading were reviewed. An advisory committee was formed with teachers who have called requesting materials to teach literacy to older blind students, master teachers identified earlier during field testing and visits to observe prototypes in use, and recommendations of trustees. The committee met in March 2000 to develop product specifications for these materials. A directing editor for the project was selected and a team of writers was assembled. Development of project materials was initiated. To build background for the writing, consultants met at APH, toured the facility, and spent time talking to blind employees about problems adults who are blind often face as well as activities people who are blind enjoy in their leisure time. In FY 2002, development of the program continued, and members of the writing team attended the National Symposium on Literacy for Adults with Visual Disabilities, sponsored by the American Foundation for the Blind (AFB).

Work During FY 2003: Development of the language strand of the lessons was completed and the phonics strand is continuing at a slower, but steady pace. The Project Leader worked on six introductory lessons which introduce braille reading and writing; informally assess listening comprehension, tactual discrimination, sound discrimination (phonemic awareness), and language development, and assess past reading achievement with a reading inventory. The plan for introducing phonics and braille concepts for reading was modified for better vocabulary generation and tactual contrast.

Work Planned for FY 2004: Development of the lessons will continue.

Braille Production Study (New)

Purpose: To provide guidelines for production methods to be used for materials for young braille readers.

Project Staff: Eleanor Pester, Project Leader

Joe Petrosko, Specialist in Project Design and Statistical Analysis,
University of Louisville

Background: This project grew out of a discussion of the best method to use to produce captions for books which contain words to be read by the child-some of the first braille he or she will be examining. APH utilizes a number of methods for producing braille, but very little research has been done to compare the readability of the braille produced by the various methods. This study will compare the tactile discriminability and accuracy of braille using kindergartners, first graders, second graders, and third graders on nine, one-character items, three, two-character items, and three, three-character items presented in stimulus match exercises produced in the following ways:

- Braille from plates pressed on paper
- Braille generated via computer on the Braillo on paper
- Braille from plates pressed on plastic
- Ink-print braille embossed via Tactile Vision on paper

Subjects will be tested individually. They will be given the four different tests in random order. It is hoped that APH staff will be able to collect data from 20-25 subjects at each grade level. Materials for the testing have been produced, and test sites are being sought. Data collection should begin before Annual Meeting.

Work Planned for FY 2004: Data collection will continue until a sufficient number of subjects have been tested. Tests will be scored and data collated by APH staff. Joe Petrosko will be responsible for analyzing the data.

Flat Stylus (Completed)

Purpose: To develop a very thin, flat stylus for braille note-taking purposes that can be easily stored in a notebook pocket.

Project Staff: Tom Poppe, Project Leader/Designer

Background: The need for a flat, storable stylus became apparent to the Project Leader while assisting with the design and prototyping of a notebook being developed by another Project Leader. The ability to include both a slate and stylus in a notebook was needed; storage of the slate did not pose a problem, but inclusion of any of APH's current styluses was problematic. This need for accommodation of a stylus in a small notebook pocket led to the design of a new stylus. The primary purpose of the *Flat Stylus* is to serve for short note-taking tasks (e.g., recording a telephone number or address).

The following activities were undertaken in FY 2002:

- Several cursory samples of the *Flat Stylus* were made by the Project Leader and offered to a number of in-house individuals who are blind for trial purposes.
- The concept and a copy of one of the first samples of the Flat Stylus was submitted to the APH Product Evaluation Team (PET), then to the Product Advisory and Review Committee (PARC) for final approval. Permission was granted from both committees to develop the product.
- The Project Leader met with the Product Advisory and Review Committee (PARC) to establish a timeline for development and production.
- The Project Leader investigated production materials/methods for the Flat Stylus and decided on a resin casting process—a process new to the production of APH materials. An outside vendor was selected.
- Sample prototypes were made in-house by the Project Leader and sent out for field testing purposes in August 2002. Field test sites were chosen in the states of Nebraska, Illinois, Virginia, Minnesota, Kentucky, Alabama, Georgia, Florida, Indiana, and California. A total of eighteen stylus users evaluated the *Flat Stylus*.

Work During FY 2003: Field test results were compiled and used to determine modifications to the original design. Test results indicated that two different sizes of styluses should be offered. Quota approval was received in October 2002 at the Annual Meeting. The product designer monitored the quality of the product during the pilot and first production runs in April. This product was eventually included as a component in three other APH products.

Work Planned for FY 2004: This product is now complete and available for APH. No further work is planned.

Fun with Braille Books

[Formerly Braille Contraction Practice Books] (Continuing)

Purpose: To provide additional practice in using various contractions for students who are learning braille.

Project Staff: Eleanor Pester, Project Leader
Robin Garberg, Consultant/Writer

Background: In a recent survey conducted by APH to determine needs in Grade 1

and Grade 2 braille, practice materials for braille contractions were identified as a need for both students learning to read initially using Grade 1 braille and those using Grade 2 braille. Research has shown that practice in identification of the contractions increases reading speed and comprehension. Books with short stories, lists of words, tips on usage, puzzles, and game-like activities would offer such practice in an exciting way.

The Product Advisory and Review Committee approved this project, and a focus group met to share ideas on September 24, 2001. Participants included the following:

- Shiela Amato, braille Instructor from Massapequa, New York
- Warren Figueiredo, Ex-Officio Trustee and Director of the Instructional Materials Center in Baton Rouge, Louisiana
- Betty Modaressi, Textbook Writer from Chicago, Illinois
- Diana Myers, Textbook Writer from Chicago, Illinois
- Rick Roderick, Assistive Technology Specialist at the Kentucky Department for the Blind in Louisville, Kentucky
- Deanna Scoggins, Teacher at the Kentucky School for the Blind in Louisville, Kentucky
- Mila Truan, Reading Specialist at the Tennessee School for the Blind in Nashville, Tennessee

The focus group created a set of detailed specifications for the development of braille contraction practice books. During FY 2002, ideas were collected for use in the books, but efforts were concentrated on *Quick Pick Braille* that would be easier to develop and produce first.

Work During FY 2003: This project was split out and given its own name. The collection of ideas for a contraction book grew slowly. Then at the California Transcribers and Educators for the Visually Handicapped (CTEVH) Conference, a very creative teacher, Robin Garberg, gave a wonderful presentation entitled, *Fun Ideas for Teaching Braille*. When she started talking about ideas she used for helping children with confusing contractions, she seemed like the right person to work with us on this project. She has been given a contract to develop a book, and has a good start.

Work Planned for FY 2004: A prototype book will be completed, reviewed, and prepared for production.

Patterns Library Series, Print Editions (Continuing)

Purpose: To develop print editions of the *Patterns Library Series Books* suitable

for use by sighted adults to help the young braille reader.

Project Staff: Eleanor Pester, Project Director

Debbie O'Connell, Braille/Print Proofreader
Carol Roderick, Research Assistant

Background: In response to numerous requests through the years, which have increased as more braille readers were mainstreamed and working with sighted teachers and parents who did not read braille, print editions of the *Patterns Library Series* are being developed. The Print Edition of the *Preprimer Level*, the first level in the *Patterns Library Series*, was back translated by Warren Figueiredo, an Ex-Officio Trustee from Louisiana and produced by APH in 1998. This edition has been well received.

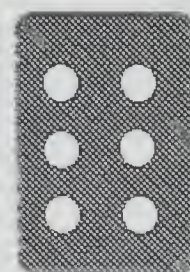
Work began on the print edition of the Primer Level of the *Patterns Library Series* when two teachers from North Dakota, Diana Mihulka and Donna Iszler, offered to do the back translation and their offer was accepted. After receiving the translation on disk, consideration was given to producing the print edition in larger print, but the decision was finally made to keep the print size the same as that used for the *Preprimer Level*, but use a more readable font. To allow the sighted person to better help the young braille reader with word attack skills, a new feature was added inside the front cover that walks them through possible steps that could be used in the process.

Work During FY 2003: The print edition of the *Primer Level* of the *Patterns Library Series* was completed in 2003 and is now available. Soon after this, work began at APH on the First Reader Level of the *Patterns Library Series*. Since this level includes a number of books available commercially in print, it was necessary for Inge Formenti, our librarian, to contact the copyright holders and seek permission to use their books in this special print edition. When this was done, Diana Mihulka and Donna Iszler, who had offered to help us once again, were told that they could go ahead with the back translation for the project.

Work Planned for FY 2004: When braille translation for the project is completed, the print will be proofread against the braille books. Then layout and design will be done and production will be scheduled.

Pop-A-Cell (Completed)

Purpose: To develop a tool that introduces the configuration of the braille cell and can be used by students, teachers, parents, and adventitiously blind adults who are just learning braille.



Project Staff: Karen J. Poppe, Project Leader
Tom Poppe, Pattern and Model Maker

Background: Since the debut of the *Score Card* many requests were submitted from the field to develop additional teaching tools employing the same reusable, fun pop-bubble format. A single braille cell presentation was one such suggestion. *Pop-A-Cell* is a structural variation of the existing APH *Score Card* which allows those just learning braille to become familiar with the configuration of a single braille cell and related dot positions. It may also be used as a braille awareness tool with sighted children and adults.

The Project Leader designed the final product that consisted of: 1) four *Pop-A-Cells* of different colors, 2) a Braille Alphabet Card (already available from APH), and 3) brief instructions for use. Tooling of the *Pop-A-Cell* began in August 2002 and was completed by the end of September 2002 along with product specifications.

Work During FY 2003: The Project Leader obtained quota approval from the Educational Product Advisory Committee (EPAC) for this product in September 2002. The final product became available in January 2003. Each package contained a blue, red, yellow, and green *Pop-A-Cell*. Many *Pop-A-Cells* from the first production run were distributed as giveaways at several spring conferences (e.g., CTEVH). The Project Leader monitored the quality of the production runs and assisted in the readying of promotional brochures/catalog descriptions.

Work Planned for FY 2004: The product is officially completed. No further product development is planned.

Quick Pick Braille

[Formerly under Braille Contraction Practice] (Continuing)

Purpose: To provide additional practice in using various contractions for students who are learning braille.

Project Staff: Eleanor Pester, Project Leader
Carol Roderick, Research Assistant

Background: In a recent survey conducted by APH to determine needs in Grade 1 and Grade 2 braille, practice materials for braille contractions were identified as a need for both students learning to read initially using Grade 1 braille and those using Grade 2 braille. Research has shown that practice in identification of the contractions increases reading speed and comprehension. The Product Advisory and Review Committee approved this project, and a focus group met to share ideas on September 24, 2001. Participants included the following:

- Shiela Amato, braille Instructor from Massapequa, New York
- Warren Figueiredo, Ex-Officio Trustee and Director of the Instructional Materials Center in Baton Rouge, Louisiana
- Betty Modaressi, Textbook Writer from Chicago, Illinois
- Diana Myers, Textbook Writer from Chicago, Illinois
- Rick Roderick, Assistive Technology Specialist at the Kentucky Department for the Blind in Louisville, Kentucky
- Deanna Scoggins, Teacher at the Kentucky School for the Blind in Louisville, Kentucky
- Mila Truan, Reading Specialist at the Tennessee School for the Blind in Nashville, Tennessee

The first suggestion from the group was to create a *Quick Pick* for braille contraction practice. In FY 2002, work began on *Quick Pick Braille* that incorporates all of the contractions and shortforms in Standard Braille into two *Quick Pick* card packs.

Work During FY 2003: *Quick Pick Braille* was evenly divided into two sets, each containing an equal number of contractions and shortforms. Suitable foils were found for each one. It was decided that field testing would not be necessary unless there is a change in format.

Work Planned for FY 2004: *Quick Pick Contractions* will be tooled for braille production. If a change of format is necessary, minimal field testing will be done.

Reading for Adults in Uncontracted Braille (Continuing)

Purpose: To provide ongoing and up-to-date reading practice of interest to older readers who read only uncontracted braille.

Project Staff: Eleanor Pester, Project Leader

Background: More materials in uncontracted braille have been needed for quite some time. Since older, adventitiously blind readers usually begin reading braille by learning the letters, additional practice reading materials in Uncontracted Braille could be of benefit to quite a large number of people. Additional practice could help these new braille readers develop fluency and speed. Research shows that older adults, the segment of the population most likely to lose their vision, need more time and practice materials to learn new things. Surveys, including one done recently at APH, show that there is a need for such materials. Some adults will read uncontracted braille indefinitely, and they would enjoy short selections on the same variety of topics as their sighted peers. Excerpts from

a popular and familiar periodical would offer an ongoing source of new reading material and would be motivational to many. This would fill both educational and recreational needs for older students. The Product Advisory and Review Committee approved this project.

Work During FY 2003: APH personnel met and discussed what would be involved in producing such a periodical and what the next steps should be.

Work Planned for FY 2004: Appropriate plans will be made concerning production of a prototype and field testing.

Revision of Patterns: The Primary Braille Reading Program (Continuing)

Purpose: To revise and update *Patterns: The Primary Braille Reading Program*

Project Staff: Eleanor Pester, Project Leader
Betty Modaressi, Editor/Consultant
Carol Roderick, Project Assistant

Background: *Patterns: The Primary Braille Reading Program* was designed to teach reading to children who will use braille as their primary reading medium. It was built on strong reading and braille principles and has remained an effective learning tool since its debut in 1980. In education, where textbooks over five years old are considered outdated, *Patterns* is now ancient history. Times have changed, and for some years full inclusion method to reading instruction has been in vogue, first with whole language and then with phonics playing important roles. Some teachers are having a difficult time justifying use of a program the age of *Patterns*. Young braille readers, however, still need a firm foundation of beginning braille reading upon which to build. It is the goal of this project to produce an updated and enhanced braille reading program for beginners by building on the successes and philosophy of *Patterns*.

In September 1997, a Project Advisory Committee (a.k.a. Product Advisory and Review Committee) met at APH to discuss the revision of *Patterns: The Primary Braille Reading Program*. Decisions were made regarding features that should be kept, features that should be changed, ways to update the content, and topics that would be of interest to today's visually impaired children. The committee discussed current trends in reading for the general population, some new programs and methods for teaching reading and language arts, and the use of tactile graphics with young children. In 1998, a detailed timeline and budget were developed for this project. Work on a revised prototype of the early levels of the program began. An extensive bibliography on the latest literature related to braille reading was compiled and reviewed by project personnel. Current reading programs were also reviewed. In 1999, the basic prototype for the kindergarten level of the *Patterns* revision was developed, and ideas for supplementary phonics and

character development tapes, games, and books were explored. In 2000, changes were made in the kindergarten level based on conference sessions, reviews of research, and Product Advisory Committee (a.k.a. Product Advisory and Review Committee) recommendations. Work began on the 1st grade level of the program. New approaches to teaching reading continued to be investigated. In 2001, work continued on the kindergarten and 1st grade levels of the program. A draft of the kindergarten level was completed.

In 2002, work continued on the preparation of the kindergarten level for field testing and on the development of the 1st and 2nd grade levels. In 1st grade, whole words like and and for were introduced as part words. Long vowel sounds with various spellings and other vowel sounds with contractions such as ar, er, ed, in, en, one, ow, and ou were presented. Independent writing on the braillewriter became part of the lessons. Context clues continued to be stressed. Additional vocabulary was introduced in anticipation of using it later with currently published stories that can be transcribed into braille and included in the pupil texts. This was a recommendation of the project's advisory committee. Simple raised-line illustrations were included.

Work during 2003: The kindergarten text and teacher's guide were finished. Activities and lesson parts were written to illustrate that consonants appear at the beginnings and at the ends of words. This was done with phonemic awareness activities (listening activities) and sound and symbol associations activities. Word patterns were used to show children how to use their knowledge of sounds and symbols to make words they can read and write (decodable words). Decodable words were used along with words presented in the lessons in context. Part words and, for, of, the, and with continued to be used to help the children make additional decodable words. Stories that can be used in separate little books or worksheets to give children additional practice with reading, using both taught vocabulary and recognizable decodable words, were written. Library and book store research was done to see what sighted children are reading and to find out if some of the current material can be transcribed into braille. Such books and stories can be used in reading lessons and for recommended additional reading. Braille contractions en, ed, er, ar, and others such as ch, sh, th, and wh were presented and used. Children were taught to build long-vowel words with CVCe, een, and eed. Some dot 5 words were taught in the first grade and more were taught in the second grade. The endings s, ed, ing, er, and est were added to known and decodable words. Vocabulary was picked up and rearranged so that all new and decodable words do not come at later levels.

Work Planned for FY 2004: The kindergarten level will be prepared for field testing. The first grade level will be completed, and work on the second grade level will continue.

Early
Childhood
Suzette Wright

Alphabet Scramble (Continuing)

Purpose: To provide additional braille/print, tactile/visual storybooks as requested by evaluators of previous *On the Way to Literacy* books

Project Staff: Suzette Wright, Project Leader/Author
Tessa Wright, Project Co-leader

Background: Telling a story about the alphabet family, *Alphabet Scramble* features a rhyme for each letter and an illustration for each rhyme. Every rhyme contains the letter word for the letter spotlighted in the rhyme. Illustrations consist of a single line of braille/print letters for the child to explore and track. *Alphabet Scramble* was first developed and tested with the *On the Way to Literacy III* set of books. At that time, evaluators requested it be produced; however, their assessment of students' interest in the book was not as high as for other books in the set. Younger students and print-reading students, they suggested, preferred the more heavily illustrated books in the *On the Way to Literacy* series. Given these results, the Project Leader decided to re-evaluate the book with older students. Advice was sought from expert reviewers, and the book's text and graphics were rewritten to incorporate varied spacing between letters, progressing in difficulty. The redesigned book was sent for evaluation with kindergarten through second grade students; six evaluators returned teacher questionnaires indicating the book should be produced. All but one evaluator agreed the book would benefit potential braille readers in kindergarten through second grade. Four evaluators responded the book was interesting and appropriate for this target audience; however, two disagreed, indicating the book was more suited to a preschool and kindergarten audience. Unfortunately, only two child data forms were returned (far fewer than anticipated), thus it was not possible to use individual students' responses to pinpoint the target population and determine whether further modifications could improve the book.

Additional expert reviewers were contacted in an effort to determine the book's target audience and value for this audience. They agreed the book was most appropriate for upper preschool and kindergarten level students - slightly beyond the level of most *On the Way to Literacy* books. It was suggested that some students with multiple disabilities might benefit from the book's presentation of single lines of the same braille letter. Most reviewers were positive about the book's usefulness for students; others indicated they accomplished the same objectives - tracking lines of braille and fostering letter recognition in other ways and did not believe they would use the book.

Work During FY 2003: The project was returned to the PARCing lot until the Project Leader's time permitted work to begin again. The project was removed from the PARCing lot in the summer of 2003. The project's co-leader has reviewed the project's history. A schedule has been roughed out and an initial meeting with the graphic designer was held.

Work Planned for FY 2004: Additional prototypes of the book will be created. Another evaluation of the book will be carried out with students who function at the upper preschool and kindergarten level. Both students with and without multiple disabilities will be sought. Results of the evaluation will determine the target population and whether further revisions are indicated. If the evaluation is favorable, final text and graphics will be provided to the graphic designer for creation of text and graphic files needed for printing and production of the book.

Moving Ahead: Storybooks for K-2 (New Initiative)

Purpose: To develop braille/print storybooks for upper preschool, kindergarten, and first grade students featuring tactile illustrations designed to encourage tactual exploration, refine tactual discrimination, and introduce tactile symbols, simple keys, and maps in the context of a story.

Project Staff: Suzette Wright, Project Leader/Author
Lois Harrell, Project Consultant/Author
Dr. Mila Truan, Project Consultant
Dr. Josephine Stratton, Project Consultant

Background: Symbolic visual displays, such as maps and diagrams, play an increasingly important role in textbooks and computer displays for students with typical vision. This presents a special challenge for students with significant vision loss. Observers have suggested the difficulty many individuals experience in interpreting tactile displays may be due, in part, to lack of early exposure. Storybooks developed in this project are designed to provide young students with opportunities to explore and interpret tactile displays that use raised symbols, lines, and areal patterns to represent story elements and depict spatial relationships among elements. Of equal importance, the storybooks offer exposure to braille/print used in a motivating and meaningful context, fostering emergent and early literacy skills. The braille/print text of the books is intended to be read aloud by an adult reader. Embedded text (in large print and a choice of contracted or uncontracted braille) offers opportunities for the student to explore and read single words and short phrases.

Initially, the Project Leader's efforts focused upon identifying objectives and selecting or creating story texts and graphic media to support these. Lois Harrell agreed to serve as project consultant, authoring two books and reviewing drafts of other books. Story drafts were selected based on input from expert reviewers. A variety of tactile media were considered. Paper embossed graphics were chosen for the first book since these are commonly used and combine easily with visual graphics. The Tactile Visions process was chosen as the medium for three books as it permits fine detail and can be combined with colorful graphics to create tactile/visual displays at a reasonable cost. Time

was spent testing paper stocks, temperature, and processing speeds for the Tactile Visions process as well as investigating means of registering visual and tactile images. A new palette of lines and symbols were created to accommodate the Tactile Visions medium. Sample tactile displays were used with nine typically sighted and visually impaired adults to assess discernibility.

Art, text, and layout for four books were completed; eight prototypes of each of the four titles were hand-produced. Storyboards were created for the books; these feature symbols from the story were mounted to Velcro[®]-backed pieces. These can be moved about the fabric board, enabling the student to create their own tactile display. A brief Reader's Guide was created to accompany the books.

Seven teachers at seven sites participated in the field evaluation of the books and accompanying storyboards. Evaluators based their feedback upon use of the books for an eight to ten week period with 23 students ranging in age from four and a half to 11 years of age. (Four students over age seven were identified as functioning below age level.) Twelve students primarily used the books' tactile graphics; 11 students used both tactile and visual graphics. Teachers identified 17 as braille users, four as combination readers, one print reader, and one uncertain.

The books appear to cover the target audience well; without dissension, teachers indicated texts and tactile graphics for all four books were interesting and appropriate for kindergarten and first grade students. Two of the books were considered to be more simple and were rated by all evaluators as appropriate/interesting for upper preschool; a majority also extended the books' value upward to second grade students. Teachers reported 94–100% of the students had benefited from using the books during the evaluation period and would benefit from using the books for a longer period of time. Reasons given included: increased motivation to read and exposure to braille and tactile exploration; allowed student to experience tactile graphics with a purpose; tactile graphics made the books more fun and motivated him to use his hands to explore and draw in information; helped tracking skills. The tactile graphics were also credited with enhancing understanding of the stories (90% of the students). Teachers observed students engaging in a range of emergent literacy tasks.

Storyboards were strongly endorsed by the teachers, who agreed they improved comprehension, offered students the important opportunity to create/draw their own graphics and were highly motivating. A majority of evaluators commented favorably on the Tactile Visions graphics. All evaluators rated the visual graphics in the books as a very important component of the books, promoting shared reading with typically sighted peers and adults and supplementing tactual information for the many braille readers with usable vision. Three project consultants also reviewed prototype books. Suggestions were made to improve symbol discernibility in two books; an areal pattern will be modified in the third book. It was suggested that one of the books be shortened.

Work During FY 2003: Final revisions to the four books, accompanying

storyboards, and *Reader's Guide* were determined based on the evaluation data. The *Reader's Guide* was rewritten, lengthening it to offer more information about emergent literacy, purpose of the books' tactile graphics, and suggestions for introducing the student to the graphics. The four *Moving Ahead* storybooks and accompanying components received quota approval. The first of the four storybooks, *Goin' On a Bear Hunt*, moved into a pre-production phase. Final text, scale drawings, and instructions for final layout were given to the graphic designer, who created graphic files for all the book's components. Visually attractive, undetailed color washes for the book's backgrounds and cover art were created by the graphic designer.

Tactile drawings, to be embossed by the PEARL on plates, were also placed in a graphic file format by the graphic designer. The Project Leader and graphic designer worked closely to ensure accuracy of the detailed files and registration of all graphic layers. Sample tests were run using production paper stocks to ensure compatibility of the outside vendor's inks and the Tactile Visions process; several problems encountered were resolved. Quotes obtained from vendors guided final decisions regarding all four books' cover and binding style. Tooling was completed for all four books' embedded words; these are to be provided as clear stick-on labels. The 16-page *Reader's Guide* was formatted and is ready for publication. Final text and layout for the second and third books' text is complete and ready for the graphic designer; small revisions remain to be made to the tactile graphics.

Work Planned for FY 2004: The Project Leader will shorten the fourth storybook before beginning pre-production and tooling. The four books will be produced one at a time to assist their flow through the pre-production/tooling phase and final production. Final tooling for the first book will soon be completed—including all graphic files and plates. Technical Research staff will write detailed production specifications. The first book will proceed to production, be priced, placed in inventory, and its availability announced. The second, third, and fourth books will move toward production as the work of the graphic designer, assisted by the Project Leader, is completed, other final tooling is prepared, and production specifications are written.

**Revision of the Handbook: On the Way to Literacy:
Early Experiences for Visually Impaired Children** (Continued)

Purpose: To revise this handbook for parents and teachers to provide the most current information concerning emergent literacy for children with visual impairments.

Project Staff: Suzette Wright, Project Director
Dr. Josephine Stratton, Consultant
Monica Vaught, Research Assistant
Jenny Dortch, Research Assistant

Background: Dr. Josephine Stratton was the primary author of the first version of the handbook written in the late 1980's and published by APH in 1991. One hundred-twelve pages in length, it presents a framework for developing the abilities that form the foundation for literacy in blind and visually impaired children from infancy through the preschool years. Communication, tactual exploration and hand skills, concept development, experiences with books and exposure to braille are addressed. Book lists guide readers in selecting appropriate books for their child, and resource lists suggest additional readings to extend parent/teacher knowledge. Since publication of the handbook, knowledge in the field of emergent literacy for typically sighted and visually impaired students has expanded.

Additional research documents the importance of meaningful exposure to written materials, the value of read-aloud stories, and the importance of a rich conceptual base built upon first-hand experiences. New research suggests the importance of the reading/writing connection and of phonemic awareness. Information about the use of symbols and the young child's development of the concept of a symbol will be featured in the revision, as will guidelines to assist parents and teachers in making their own tactile adaptations of commercial storybooks and homemade storybooks. Late in 2002, the Project Leader and project consultant began reviewing recent literature regarding emergent literacy for typically sighted and visually impaired children in preparation for revising the handbook, identifying areas to be added, emphasized, and extended. A contract was negotiated with Dr. Stratton in September 2002.

Work During FY 2003: The Project Leader and research assistants gathered information to update the handbook's resource lists and suggested reading lists. A wide range of new materials for parents and teachers - written, videotaped, and web-based were included. Commercially available children's books were reviewed in order to update the handbook's lists of recommended storybooks for children with visual impairment. The Project Leader grouped entries for the book lists and appendices; these have been formatted and annotated by project research assistants. Original files for the handbook were converted into a Word document to enable revisions to be inserted. The Project Leader and consultant continued to share information to be added to the revised handbook and review rough drafts of new material. They met for four days in August to work on the handbook draft. Personal stories were solicited from parents and educators concerning their child or student's emergent literacy experiences; these will be incorporated into the handbook. The Project Leader has met with the project graphic designer; initial plans were made to improve upon the book's cover art and illustrations. It will be reformatted to fit a standard page size. Input will also be sought from field reviewers.

Work Planned for FY 2004: Work on the revised handbook will continue. The completed draft will be reviewed by teachers and parents, revised accordingly, and prepared for final editing and cosmetic updates to the format, cover, and illustrations.

Rolling Right Along Series (Book 1: Rolling Into Place) (Completed)

Purpose: To develop a storybook design that develops tracking skills and spatial understanding needed by young children with visual impairments and blindness.

Project Staff: Karen J. Poppe, Project Leader/Co-Author
Jane Kronheim, Product Consultant/Author
Tom Poppe, Pattern and Model Maker
Bernadette Mudd, Graphic Designer



Background: In October 2000, the product developer was invited by APH's Product Advisory and Review Committee(PARC) to share some of her product ideas and original handcrafted items appropriate for an early childhood population. One of the items shared was a Velcro[®]-path covered storybook for developing children's tracking skills and early understanding of spatial relationships. The book serves to accelerate the acquisition of hand skills needed by young children with visual impairments and blindness by encouraging them to search in a systematic manner (left to right, top to bottom), discriminate between various textures (smooth, rough, soft), interpret simple map displays, and discern sound differences. These skills can be learned as the child guides a Velcro[®]-covered ball along maze-like paths to its final destination. The noticeable sound produced by the traveling Velcro[®] ball assists the child to keep the ball on course as it travels from page to page. Beyond the obvious tactile skills addressed through the book's format, a wealth of basic educational, spatial, and directional concepts are reinforced. Language skills are also enhanced as the child actively describes the movement of the ball as it shifts directions. In November 2001, the PARC approved the product for development.

A simple story was written to accompany the Velcro[®] paths that lead to the book's surprise ending - the ball becoming a nose on a face. The original three-hole punched foam pages for inclusion in a ring binder were changed to a more producible and functional accordion-folded panel; this format resulted in a game board appearance that allowed the ball to travel more smoothly from page to page. The in-house graphic designer prepared the front cover design of the book as well as the whimsical face at the end of the Velcro[®] path. The Project Leader designed the interactive Velcro[®] face pieces (i.e., glasses, ears, eyebrows, and hair bow/bow tie) included to make the book more versatile and entertaining to a young audience. An Author's Letter detailing the purpose and extended uses of the book was also included.

The prototype of *Rolling Into Place* was field tested by 13 teachers of the visually impaired representing the states of Arkansas, New Hampshire (two), California, Ohio, Kentucky, Colorado, Missouri (two), Massachusetts (three), and Georgia. These teachers used the storybook with a total of 74 children who ranged in age from one to eight years

old; the majority (67 of the 74) was two to five years old. This sample was composed of 31 braille readers and 37 large print readers. The remaining sample either had undetermined reading media or read both large print and braille. Twenty-eight children had additional handicaps.

All necessary revisions to the prototype were implemented based upon field test results. All production tooling and product specifications were completed during FY 2002 .

Work During FY 2003: The Project Leader monitored the quality of the pilot run in the January 2003. Additional production runs took place in March 2003. Post-production tasks for the Project Leader included assisting in the development of product brochures, showcasing the new product at conferences and workshops (e.g., Northeast AER Conference in Hartford, Connecticut), and reviewing future *Rolling Right Along* books submitted by the author.

Work Planned for FY 2004: Prototype development of a *Rolling Right Along Construction Kit* [see separate report] based upon the design established for *Rolling Right Along* will be initiated.

Rolling Right Along Construction Kit (New)

Purpose: To provide a *Rolling Right Along Construction Kit* that can be used by parents and teachers to create their own books in a similar format to the newly available *Rolling Into Place*. The books created by parents and teachers can be tailored to a specific child's interests or tactile/visual needs. The basic concept and structural design of a Velcro[®]-covered ball moving along a meandering path with the child's assistance will be mimicked to encourage visual and tactile scanning skills, understanding of directional/spatial concepts, and development of needed hand skills.

Project Staff: Karen J. Poppe, Product Co-Developer/Project Leader
Jane Kronheim, Product Co-Developer/Author

Background: After the recent debut and successful reception of the *Rolling Into Place* storybook [see separate report], Jane Kronheim submitted three additional ideas and story rhymes for similar books. These story sketches were reviewed initially by the Project Leader, and later by Product Evaluation Team (PET). Given the expensive and time-intensive factors of assembling the first book, paired with the uncertainty of producing more books with topics that might or might not appeal to wide audience, the Project Leader proposed field testing a construction kit option that would allow parents and teachers to build similarly-designed books around themes that interest their student(s) or child(ren) and, at the same time, address needed tactile and visual skills.

Work During FY 2003: In July 2003, the Construction Kit idea was presented to the Product Advisory and Review Committee (PARC) and approved for development. The Project Leader proceeded to present the idea to the Jane Kronheim and to outline anticipated components of the kit which include the following:

- Two or three pre-made, accordion-folded panels in different colors with die-cut front covers
- Velcro[®]-covered balls
- A continuous strip of adhesive-backed looped Velcro[®] (for path creation)
- Clear adhesive sheets for braille purposes
- Accompanying documentation displaying possible book scenarios/rhymes
- Hints and Tips for making books visually and tactually interesting

In September 2003, a PARC meeting was conducted by the Project Leader to familiarize Production staff with the anticipated structure and components of the product. A product timeline was established.

Work Planned for FY 2004: Prototype development of *Rolling Right Along Construction Kit* based upon the design established for *Rolling Into Place* [see separate report] will be initiated. The product developers will author accompanying documentation and multiple packages will be readied for field test purposes. The product developers will conduct on-site workshops with parents and teachers to build sample books. A selection of book ideas generated by field reviewers will be showcased in the accompanying documentation for the end product. A website-sharing opportunity for parents and teachers to share their book creations will be explored.

Educational Games

Staff

Armadillo Army (Continuing)

Purpose: To provide a simple, high contrast game that lets the student practice and perfect his lateral eye movements, vertical eye movements, searching skills, timing skills, visual discrimination skills, peripheral detection skills, eccentric viewing skills, and eye-hand coordination, while doing a leisure activity like those of his/her peers.

Project Staff: Elaine Kitchel, Project Leader
Larry Skutchan, Project Consultant
Rodger Smith, Programmer
John Hedges, Programmer
Bridgett Johnson, Graphic Artist
Andrew Zipp, Animation Artist

Background: *Armadillo Army* is a maze game that uses three mazes that have wide and bright lanes. The maze is a two-dimensional overhead view as with Pac-Man, but much larger. The maze should be a ten-unit by ten-unit grid, rendering 100 squares in which to move, camp out, or grab goodies.

The main character is TEX, a yellow humanoid with a yellow ten-gallon hat, whose goal is to gather up goodies in the maze, yet keep away from the armadillos that roll at random through the maze. As TEX gathers up goodies, he gets points. When he gets enough points, he accumulates power with which he can send out a yellow ray from his finger to zap armadillos and make them disappear. When he does zap them, his accumulated points decrease and he cannot zap again until he accumulates enough points again.

In the maze are four FREE CAMPING zones, designated by a large pink X, where TEX may camp out and stay safe from the armadillos, but can not gather any points. In the first three levels the camping zones are located at strategic points on the grid. TEX must pick up all the goodies in the maze at each level. Once he has gathered up all the goodies, he moves to the next level, even if there are armadillos still trolling the maze. If one or more armadillos overtake TEX, he *Dillo-out* and must begin the level over. He also loses 30 points. If he has less than 30 points, his score goes back to zero.

The maze changes after every third level. The first maze (which has three levels) has bright orange walls, the second maze (which has three levels) has bright pink walls, and the third maze (which has four levels) has bright green walls. With each level, the number and kinds of goodies to pick up increases, as does the number of armadillos that enter the maze from four doors along the sides of the maze. On the fourth maze and all mazes thereafter, a large orange pumpkin appears in one of the four center squares of the maze. TEX must beat the armadillos to the pumpkin. If he does, he gets a freebie. A freebie means he can *Dillo-out* once and continue playing before *Dilloing-out* again.

This is a child's game with software on a CD. It will be packaged as standard APH software.

Work Completed in FY 2003:

- Game design and specifications were developed.
- Wrote game prototype
- Began adding levels.
- Added introduction screen to take students' names.
- Tested, debugged, and finalized several aspects of the game.
- Artwork for the game was designed and animated.
- Graphics for packaging and product documentation were designed.

Work Planned for FY 2004: Programming will be finalized, and field testing will begin. The test and correct cycle will continue until all reasonable issues are addressed, then the CD master will be produced, and the game will be made available.

Talking GlowDice

[Formerly Electronic Talking Dice] (Continuing)

Purpose: To develop a custom-made, accessible talking dice that can serve as a stand-alone product or be used with commercially-available board games by children and adults with visual impairments and blindness.

Project Staff: Karen J. Poppe, Product Originator/Project Leader
James Robinson, Circuitry Designer
Tom Poppe, Case Designer
Robert Meredith, Sound Technician
Frederick Otto, Narrator

Background: During initial efforts on the *Web Chase* game [see separate report], the Project Leader recognized the need for an accessible dice (other than existing tactile dice) that could simultaneously display and audibly announce the number rolled. Additional features desired for the battery-operated unit included the ability to generate truly random numbers, the provision of optimal visual contrast, a PLAYBACK feature, a stationary and compact case, and a contemporary appearance that is attractive to sighted peers as well. First-year development activities involved the Project Leader working with the in-house circuitry designer to develop an initial working prototype. The first working model contained red LEDs (in an H-configuration) that mimicked the dot patterns of conventional dice, an easily activated ROLL button, a convenient PLAYBACK button with a No-Cheat Beep that distinguished the playback number from the rolled number, a clear digitized voice feedback, a Sleep feature that saves battery power, and a lightweight, durable case featuring non-skid pads.

After a few refinements to the first working model, including the substitution of blue LEDs, added clear diffuser caps, and enhanced two-color/textured ROLL and PLAYBACK buttons, multiple prototypes were readied by the end of August 2002 for field test purposes.

Work During FY 2003: Field testing was completed in October 2002. Twenty-one teachers, representing the states of Oklahoma, Arkansas, Hawaii, Illinois, Tennessee, Georgia, California, Kentucky, Nebraska, New Jersey, Iowa, and Louisiana, used the *Talking GlowDice* with a total of 87 students and adults. The students and adults ranged in age from three and a half to 58 years old. Twenty were adults; ten were five years or younger; 31 were between the ages of six to eleven; and 26 were between the ages of 12-17. Of those reporting a primary reading medium, 31 were braille readers, 23 were large print readers, and 18 were regular print readers. Twenty-six percent of the student/adult sample had additional disabilities (e.g., cerebral palsy, hearing impairment, ADHD, developmental delays).

The strengths of the device as detailed by the reviewers included the following: its auditory and visual access, its small and portable size, its fostering of social skills and independence, its simplicity (both operational and appearance), its clarity and quality of the spoken numbers, and the playback feature. The most significant revisions made to the device based upon evaluators' feedback were the inclusion of an ON/OFF switch and a volume control selection (i.e., HIGH and LOW volumes). The product name was deemed descriptive and appropriate for the device by the evaluators. In May 2002, the Educational Product Advisory Committee (EPAC) granted quota approval.

Once James Robinson made final updates to the circuitry schematic, Tom Poppe updated the outer case design. The ROLL and PLAYBACK buttons were enhanced by adding braille and print labeling to each, making them tactually different (one smooth and one textured), and assigning high-contrast colors to each. The edges of the case were sloped slightly to create a sleeker design. Artwork was prepared for the bottom of the case as well, which included the APH logo, OFF designation beside the 3-position slide switch, the catalog number, and product name. The Project Leader then prepared final content for the Product Instructions. This information will be provided to the customer in both large print and cassette formats.

Summer of 2003 was dedicated to locating a dependable overseas vendor to produce a working model based upon the readied circuitry design and outer case artwork. The selected overseas vendor modified the existing drawings by replacing a screw-attached bottom panel with a separate clip-style battery panel, one that could be easily accessed and removed by a visually impaired/blind user. The separate battery panel would also prevent unintentional handling or disruption of the circuitry board.

Work Planned for FY 2004: Once multiple working models of the *Talking GlowDice* is received from the overseas vendor and approved by the Project Leader, a full production run will follow. The current timeline states January 2004 as the Availability Date. Meeting this deadline will be contingent upon the overseas vendor's turnaround

time. The Project Leader will monitor the quality of the first production runs and assist with promotional activities.

WebChase (Continuing)

Purpose: To develop an original, recreational board game that allows children with visual impairments and blindness to develop needed tactile skills within a fun context. As players navigate their hungry spiders through an insect-laden web, they learn to do the following: trace various raised lines, identify point symbols, and discriminate textures and shapes. Other concepts and skills promoted include counting, visual and tactual scanning, turn taking, spatial relationships, organization methods/sorting skills, reading skills, strategic planning, and following directions.

Project Staff: Karen J. Poppe, Product Developer/Originator
Tessa Wright, Research Assistant/Editor
Tom Poppe, Pattern and Model Maker
Bernadette Mudd, Graphic Designer

Background: The Project Leader originated a board game design using a spider web layout which seemed ideal for presenting a variety of line paths, various textures, and point symbols encountered in many tactile graphic displays. In general, the players of the game navigate their spider token game pieces (each identifiable by a unique point symbol) through a web path of raised solid and dotted lines with the goal of capturing the most prey (represented by different textured pieces) scattered on Velcro[®] landing pads. While playing the game, young children develop much needed tactile skills (e.g., tracking, scanning, and discrimination of textures, shapes, and lines), an understanding of symbolic representations, and the interpretation of legends/keys. The inclusion of Obstacle and Advantage cards in large print and braille also gives children a chance to practice their reading skills within a fun context.

Given the encouragement received from an Annual Meeting focus group, the product idea transitioned from the PARCing Lot (a residing place for pre-approved product ideas by in-house committees) to the active development stage in June 2002. The Project Leader conducted a Product Advisory and Review Committee (PARC) meeting to acquaint in-house departments with the planned product components and expected production processes. A product timeline was established and the Project Leader held weekly meetings with the core project team

Work During FY 2003: The first quarter of FY 2003 was dedicated to the fabrication of multiple prototypes of *Web Chase*. This stage of product development focused on the following tasks:

- Designing the overall look and presentation of the game board
- Ensuring alignment between the visual and tactile components of the game board
- Writing user-friendly game instructions
- Composing content for the Obstacle and Advantage cards and designing tactually identifiable shapes for each
- Designing original game tokens with point symbols incorporated
- Determining the basic shapes, colors, sizes, and textures of two sets of prey
- Constructing a convenient and functional lunch box (later referred to as lunch tray) to organize prey collected from the web
- Fabricating a card holder specifically designed for the accompanying cards

Prototypes were completed one month ahead of schedule by the core project team and were mailed to field test reviewers in January 2003. A total of 15 teachers, representing the states of Tennessee, Kentucky, Virginia, Louisiana, Arizona (two), Pennsylvania (four), Texas, Iowa, Colorado, Delaware(two), played *Web Chase* with a total of 65 students with visual impairment and blindness in a variety of settings (resource, inclusive, residential, private school). The students ranged in age from four to 17 years old. Specifically, two percent were between the ages of four and six; 34% were seven to nine years old; 45% were 10-12 years old; 15% were 13-15; and 5% were 17-years old. The gender category was almost evenly divided with 52% males and 48% females. Of those reporting a primary reading medium, over 60% were braille readers and 23% were large print readers; the remaining percentage were reported as utilizing regular print, auditory output, or two or more media. Nearly half (45%) of the sample had other disabilities (e.g., cerebral palsy, hearing impairment, speech impairments, cognitive delays). Many of the students included in the sample played the game with sighted peers.

The evaluators' comments about the game were extremely positive with 100% agreement that the game should be produced and made available. The evaluators stressed the need for recreational games such as this one that put students with visual impairments and blindness on an equal playing ground with their sighted peers. In general, the evaluators were very pleased with the visual contrast (94% rated as very good or excellent), the tactile contrast (93% rated as very good or excellent), and overall appearance (93% rated as very good or excellent). The spider tokens received 100% approval with regard to color, durability, tactile symbols, contrast to surrounding prey, and overall shape. The teachers unanimously agreed that both types of prey (basic shape and textured) were important to developing necessary tactile skills. Among other strengths noted were the following: great tactile practice, very flexible/versatile, enjoyable, easy to understand, and fun for everyone. Many of the necessary changes were cosmetic in nature including simplification of cartoon characters and higher elevation of dotted lines; extra pieces of some of the items were also requested. The playing alternatives

suggested by reviewers were documented in the final game instructions.

The third and fourth quarters of FY 2003 were focused exclusively on the modifications to the game's design and components based upon evaluative reviews. The Project Leader conducted several meetings with the core team in making revision decisions and held several meetings to re-acquaint the PARC with expected product design, planned in-house production involvement, forecasted sales, and needed replacement parts.

The extent of tooling and product specifications for this product was extremely involved due to the number and types of materials needed, original artwork created, thermoform masters required, and the die-cutting and embossing methods planned. The Project Leader spent a great deal of time coordinating efforts between outside vendors and in-house staff to achieve these goals, as well as providing tactile/visual art direction and final approval on end design of the spider tokens, Obstacle/Advantage cards, product instructions, card holder, prey pieces, lunch trays, game box, and the game board itself.

Work Planned for FY 2004: The product specifications will be finalized and the production tooling will be readied. The pilot run and initial production run are planned for the first quarter of FY 2004. The Project Leader will monitor the quality of the production units produced in-house, as well as those produced by outside vendors. Post-production activities will include preparing marketing information, demonstrating *Web Chase* at future conferences and workshops, and exploring the creation of additional game designs for the purpose of tactile skill development.

Low Vision

Elaine Kitchel

Bright Line Reading Guide (Completed)

Purpose: To provide students with low vision a handy way of highlighting text and excluding surrounding text as they read.

Project Staff: Monica Coffey, Project Leader
Elaine Kitchel, Co-Project Leader
Frank Hayden, Technical Consultant
Alice Potenski, Product Consultant

Background: Teachers and students have made clear their desire to have handy strips of yellow and pink vinyl to eliminate glare and visual crowding while reading text.

Work During FY 2003: Product tooling and specifications were completed, artwork was finalized, the pouch was analyzed and finalized and the packaging was selected. The product was then produced, packaged and stocked for distribution.

Work Planned for FY 2004: The product is complete.

College Ruled, Bold Line Spiral Notebook (New)

Purpose: To provide collegiate ruled paper that still has bold lines, non-glare paper, and other features of the original Bold Line Spiral Notebook so needed by students.

Project Staff: Tessa Wright, Project Leader
Elaine Kitchel, Co-Project Leader
David McGee, Technical Researcher
Bernadette Mudd, Graphic Designer

Background: Since the development of the *Bold Line Spiral Notebook*, tens of thousands of them have been purchased for use by students. Older students in college preparatory classes have been asking for lines that are a little more narrow but still bold. They have also been asking for paper that is not white. This project will satisfy both needs.

Work During FY 2003: Dimensions for the spaces and lines have been researched and finalized. Research is being conducted on the cover stock and paper stock. A cover design has been chosen and prepared. Product development meetings have been held and more are planned.

Work Planned for FY 2004: Once the materials for the cover and paper stock are

chosen, field testing will be conducted. When this data is available, it will be analyzed and the product may undergo some revision. When that is completed, specifications will be drawn up, product documentation will be finished and the product will go into production.

ENVISION I: Vision Enhancement Program for Distance Devices (Completed)

Purpose: To bring a multi-disciplinary approach to the provision of optical devices and materials for training students to develop skills in using optical aids for distance viewing after the student has had a low vision examination and a prescriptive recommendation from a licensed clinician.

Project Staff: J. Elaine Kitchel, Project Leader/Writer
Carol Hotta, Project Consultant/Writer
Kristopher A. Scott, Project Assistant
Bernadette Mudd, Graphic Designer
Scott Blome, Graphic Designer/Cartoonist
Randall T. Jose, O.D., Project Consultant
Paul Bither, O.D., Project Consultant
Darlene Donhoff, Technical Researcher

Background: In 1998 APH hosted a Low Vision Focus Group. Experts in low vision from around the country gave ideas for products needed by students with low vision. The first priority of the group was to develop a curriculum, which embodied the most promising practices and included optical devices for training use by teachers and their students. The *ENVISION* product was developed to meet that need.

Work During FY 2003: Several revisions of the curricula and distance cards were done in order to promote clarity, ease of reading and usefulness. The materials, though somewhat technical, needed to be easily readable and understandable by the teacher, and the paraprofessional, while still being useful to the clinician. All curricula and materials that were sent to project consultants for review were revised according to suggested revisions.

Logos, cartoons, character drawings, and other graphics were drawn and redrawn to meet standards for visual simplicity and high contrast color for students with low vision. Expert review by optometrists and other vision professionals provided additional suggestions and revisions. Associated materials such as distance cards and consumable materials were revised according to professional reviews.

Field testing also provided suggestions for revisions, inclusions, and deletions from the materials. Selections of papers, plastics, foams, pigments, bindings, and other attributes of the program materials were finalized. Because of the complicated nature of

the product, several meetings were held to review the various product parts and their routings, bills of material, and production processes.

Initial printings of the materials exposed some process problems that were then solved before the production runs. After problem solving, the materials were printed, collated, packaged, warehoused and made ready for sale.

Work Planned for FY 2004: The project is complete.

ENVISION II: Vision Enhancement Program for Near Magnification Devices (Completed)

Purpose: To bring a multi-disciplinary approach to the provision of optical devices and materials for training students to develop skills in using optical aids for near viewing after the student has had a low vision examination and a prescriptive recommendation from a licensed clinician.

Project Staff: J. Elaine Kitchel, Project Director
Kristopher A. Scott, Project Assistant/Writer
Bernadette Mudd, Graphic Designer
Scott Blome, Graphic Designer
Randall T. Jose, O.D., Project Consultant
Paul Bither, O.D., Consultant
Darlene Donhoff, Technical Researcher

Background: In 1998 APH hosted a Low Vision Focus Group. Experts in low vision from around the country gave ideas for products needed by students with low vision. The first priority of the group was to develop a curriculum, which embodied the most promising practices and included optical devices for training use by teachers and their students. The *ENVISION* product was developed to meet that need.

Work During FY 2003: Several revisions of the curricula and distance cards were done in order to promote clarity, ease of reading and usefulness. The materials, though somewhat technical, needed to be easily readable and understandable by the teacher, and the paraprofessional, while still being useful to the clinician. All curricula and materials that were sent to project consultants for review were revised according to suggested revisions.

Logos, cartoons, character drawings, and other graphics were drawn and redrawn to meet standards for visual simplicity and high contrast color for students with low vision. Expert review by optometrists and other vision professionals provided additional suggestions and revisions. Associated materials such as distance cards and consumable

materials were revised according to professional reviews.

Field testing also provided suggestions for revisions, inclusions, and deletions from the materials. Selections of papers, plastics, foams, pigments, bindings, and other attributes of the program materials were finalized. Because of the complicated nature of the product, several meetings were held to review the various parts of the product and their routings, bills of material, and production processes.

Initial printings of the student materials exposed some process problems that were then solved before the production runs. After problem solving, the materials were printed, collated, packaged, warehoused and made ready for sale.

Work Planned for FY 2004: The project is complete.

ISAVE 101 (New)

Purpose: To provide *ISAVE* users with a handy overview of *ISAVE* and its offerings to the teacher or practitioner who is working to conduct functional vision assessments on very young or hard-to-test children.

Project Staff: Elaine Kitchel, Project Leader
Monica Vaught, Project Assistant
Larry Smith, Producer
Bridgett Johnson, Graphic Designer

Background: Calls and communications to APH indicating a need for an overview of *ISAVE* for the teacher or practitioner who wants to use *ISAVE*, but feels intimidated by it. An introduction to *ISAVE*, How to put *ISAVE* together, What is contained in *ISAVE*?, How does one prepare to administer *ISAVE*?, and What are the uses of *ISAVE*?, has been proposed and accepted as a project in the form of a video.

Work During FY 2003: The Project Leader conceived the video content and how the video would look. She then wrote the script and defined all the audio and video elements. Then the set and the props were defined and acquired for use in the video taping. The taping took place at two sites. Work on the animated character and special effects were completed. The editing phase of the video began and three rounds of editing took place. The theme song was written and recorded along with the closing credits. A narrative was recorded for the descriptive video portion of the DVD.

Work Planned for FY 2004: Expert review will be conducted and revisions will be made according to those reviews. The product cover and packaging will then be tooled. Final product documentation, specifications and tooling will follow. The product will be closed captioned and finally will go into duplication and be made ready for market.

ISAVE Visual Fields/Acuity Grid (Completed)

Purpose: The purpose is to provide persons who use the *ISAVE* materials with a transparent board for the testing of visual fields and certain general acuities.

Project Staff: J. Elaine Kitchel, Project Leader
Tom Poppe, Product Designer
Kristopher Scott, Project Assistant
Darlene Donhoff, Technical Assistant
Bridgett Johnson, Graphic Designer

Background: After the development and release of the *ISAVE* materials it became apparent that a rigid, transparent grid would be needed to perform the assessment activities in the Visual Fields and Visual Acuity chapters of *ISAVE*. Therefore APH would create a product to be used by teachers and practitioners for that purpose.

Work During FY 2003: Data analysis from field testing was conducted and changes were made to the product based upon feedback from field testing. A vinyl pouch to protect the product was designed and a prototype was made and tested in-house. Specifications and tooling were completed and a production run was made without incident.

Work planned for 2004: This product is complete

Large Print Atlas (Continuing)

Purpose: To develop guidelines for the creation, formatting and appearance of Large Print Maps. To establish a working relationship with the University of Louisville Geography Department, and to get useful product input from highly-trained consultants in the production of a truly accessible large print atlas for students with low vision.

Project Staff: J. Elaine Kitchel, Project Leader
Monica Vaught, Project Assistant
Ann Travis, Project Assistant
Lane Koniak, Project Consultant
Kathy Krause, Project Consultant
Robert Forbes, Project Consultant/University Liaison
Joseph Harrington, Project Consultant
Judy Strauss-Schwartz, Project Consultant

Bridgett Johnson, Graphic Designer
Frank Hayden, Technical Researcher

Background: The American Printing House for the Blind received a strong recommendation from the Publications Committee in 2001 and in previous years to produce a full color world atlas in large print. Previous attempts to create such an atlas met with poor results. It was decided to convene a focus group made up of people who had expertise in both low vision and geography, as well as people with experience in literacy issues and student use issues in order to develop the guidelines. The guidelines were developed in 2001 and 2002, and a work group was convened in order to learn to use mapping software (ArcView). In 2003 the consultants began work on writing the chapter content for the Atlas, in conjunction with the University of Louisville Geography department who develop and design the maps.

Work During FY 2003: Vice President in charge of Public Affairs, Gary Mudd, and his administrative assistant, Nancy Lacewell, met several times with officers of National Geographic in Washington, D.C. They opened a dialogue between APH and National Geographic for the purpose of exploring the potential for a joint effort in producing a large print atlas. In establishing these conversations, it became apparent that APH processes and National Geographic processes were not compatible and collaboration was not feasible. The decision was made to continue work on the atlas with the expert help available from the University of Louisville.

With information about the latest technology, guidelines for the content and proposed format of the Student World Atlas were shaped. The consultants and APH staff undertook work on the first two chapters and completed them in August 2003. The Project Leader and lead consultant met in August to finalize the format and devise a sample chapter and questionnaire for field testing. Twice monthly, conference calls kept all parties informed and allowed for input and feedback from all parties working on the project.

Work Planned for FY 2004: The Project Leader will work with the consultants to provide thoroughly researched and edited text to cover all continents and countries of the world. The *Large Print Color Student Atlas* will be field tested and reviewed. The Project Leader will work with the University of Louisville Geography Department to provide maps for the atlas that are made according to *the Essential Characteristics of Large Print Maps*, a list of guidelines drafted by the Large Print Atlas Focus Group. Existing digital maps will be altered according to those guidelines. Revisions, according to field testing, will be made. Decisions about final content, materials, printing and other processes will be made as well. The actual production of the *Large Print Student Atlas* is expected to take place in fiscal year 2005.

Optimizing the Reading of Continuous Text in Students with Low Vision (Continuing)

Purpose: To conduct basic research to determine visual accommodation needs, print size, magnification needs and strategies for optimizing the reading of print in students with low vision.

Project Staff: J. Elaine Kitchel, APH Project Leader
Amanda Hall Lueck, Project Consultant & Researcher

Background: This was the third in a sequence of studies on how magnification, accommodation, and the visual reserve affect reading efficiency in students who already know how to read.

Work During FY 2003: Production of reading passages was completed. The team developed comprehension questions for the selected passages and conducted pilot testing. Recording forms were designed and finalized. The research team met with on-site school staff to set up testing dates and details. Testing began with 4th grade subjects with low vision at UC Berkeley School of Optometry Low Vision Clinic. Data was collected but not analyzed.

Work planned in FY 2004: Analysis of the data must take place and a report will be prepared. Publication of the report will be sought. The results of the study will be analyzed for possible use by APH in its development of print materials for students in the future.

Science Skills Inventory (New and Continuing)

Purpose: To provide a method to allow science, classroom and VI teachers to gather information about laboratory skills or the lack thereof, for students who may be entering their classrooms. To provide some methodologies for teaching students who are visually impaired to perform common laboratory tasks. To offer resources for equipment and accessories that may be needed when teaching laboratory skills to a student with a visual impairment.

Project Staff: Elaine Kitchel, Project Co-leader
Rosanne Hoffman, Co-Project Leader
David McGee, Technical Researcher
Bernadette Mudd, Graphic Designer

Background: In March of 2003 APH convened a Secondary Level Science Focus

Group to set priorities in the sciences and to suggest product ideas to fit the priorities. The priorities were:

- Develop materials and laboratory adaptations to make concepts clear to students with visual impairments.
- Develop needed adaptive tools to use in the laboratory.
- Develop a listserv or website whereby science teachers may communicate with one another.
- Develop a tool to inventory acquired laboratory skills of a given student, and to document skills not yet developed.

Work During FY 2003: It was decided to develop the *Science Skills Inventory* first. The product idea was presented to Products and Research Committee and accepted. The co- Project Leaders researched materials and adaptations currently available through SAVI and other resources. They bought and tested current materials, tools and adaptations for soundness, usefulness, durability, cost-effectiveness and completeness. Preparations to develop the actual inventory were made and work has begun on organizing and writing the inventory. Formatting and appropriate graphics for the cover are under development.

Work Planned for FY 2004: The remaining text will be written, edited, and revised. Graphic elements will be drawn and inserted into the text. The book, along with any associated materials will be field tested and the resulting data analyzed. Further revisions will be made according to field testing results. The documentation and specifications will be drawn up and tooling will begin. Production should take place shortly thereafter.

Smaller Books Larger Print (Completed)

Purpose: To determine characteristics that would make large print books truly accessible, manageable and appealing for the end user; to set standards for APH's large print products produced in text and electronic format. To develop a font face for use in making large print documents.

Project Staff: J. Elaine Kitchel, Project Director
Will Evans, Project Assistant
Chip Dumstorf, Fontographer
Bridgett Johnson, Graphic Designer
Becki Moody, Formatting

Background: The *Smaller Books Larger Print* Project was responsible for items one and three of the directive given by the Publications Committee in May of 1998. At that time the directives were:

- Conduct research on issues surrounding large print for usability and educational validity.
- Pursue electronic book options.
- Resolve issues and set standards in clarity and contrast of text and images, point size, font characteristics, leading and density.

In the year 2000 the recommendation of the Joint Committee was expanded to include providing large print textbooks in a point size based on research and input from the field, and in 2001, uniformly adopting standards such as 18-point type and a font that has proven product efficacy.

Work During FY 2003: The second and fourth recommendations were assigned to the Accessible Textbook Initiative Collaboration (ATIC) project when it was instituted. However, the remaining recommendations were largely completed by the end of FY 2001. The low vision Project Leader researched all publications in English for the past 30 years which had relevance to standards and guidelines for the development of standards regarding large print documents, and the typographical characteristics, readability and usability of those documents. The Project Leader also worked with the Publications Director of the Federal Health Care Financing Administration and arrived at standards for characteristics of paper including weight, color, and gloss factor. Guidelines were also developed for book size, weight, page and paragraph formatting, font characteristics, font size, leading, spacing and other features of typography. These guidelines and the research which backs them were developed into a document titled *Guidelines for Optimum Readability for the Production of Large Print Documents*, and was then made public via the APH website. A brochure was developed for distribution to APH consumers and the interested public.

The Project Leader then worked with the font developer to draw a font which embraced all the identified characteristics of large print which, through research, are known to promote readability for persons who use large print. After field testing and revisions, the Project Leader and fontographer then set about making a complete suite of the (*APHont* bold, italic, etc.) for future use by large print users. The font suite was then field tested and found to enhance and promote readability over other commonly used fonts in students and adults with low vision. This was true for both short and long passages of text. Further, character recognition was improved with *APHont Suite* in both short and long passages of text. The final version of the font was hand-hinted by the fontographer, tested once again, then prepared for distribution.

Work Planned for FY 2004: The project is complete.

Tootle Tiles (New)

Purpose: To provide students with high-contrast, large imaged computer games that are the equivalent of games their peers commonly use for recreational purposes

Project Staff: Elaine Kitchel, Project Leader

Background: *Tootle Tiles* is a tile game based roughly upon the ancient game of Mahjong. Students will match exterior tiles in three dimensions until all tiles are cleared from the screen. The tiles will need to have simple, high-contrast designs on them. This is very different from Mahjong, in which the tiles have complicated designs of Chinese characters. The game will also have sound elements added for positive or negative feedback, as well as added elements such that students with blindness can also play.

Work During FY 2003: Research is underway for the selection of images that would provide the most clarity of differentiation. Color selection is also being researched. A list of game elements and features is under development and programming needs are also being considered. Audio and video files are being developed and collected.

Work Planned for FY 2004: The product research will be completed, and audio and graphic files made for all the game elements. Game specifications will be further developed and finalized. A programmer will be assigned to develop the programming of the game. The game will then be beta tested and revised according to tester feedback. Documentation will be drawn up as well as product routings and specifications. The game will then be produced and made available to consumers.

Turbo Phonics (Continuing)

Purpose: To provide kindergartners and their teachers with phonemic awareness and phonics software designed to be visible and meaningful to children with low vision and to promote their emergent literacy.

Project Staff: Elaine Kitchel, Project Leader
Jenny Dortch, Project Assistant
Ann Travis, Project Assistant
James Bliss, Ph.D., Engineering Consultant
Robert See, Programmer

Background: In the year 2000 a report came out from the National Reading Panel

that maintained that phonemic awareness and phonics presentation were the methods that worked best and proved the most efficient in teaching students to read. The problem is that most materials made for emergent literacy, do not have graphics and print of a size needed by most students with low vision. Even computer-based early literacy programs, often contain too much visual clutter, items too small to be recognized, and graphics with colors that do not contrast well enough to be interpreted by a child with low vision. *Turbo Phonics* would solve those problems and present phonemes and first-step phonics in large sizes, with high contrast, paired with audio presentation and feedback for appropriate learning and reinforcement.

Work During FY 2003: First 14 lessons for the product were written and graphics to accompany them were acquired. The graphics were then adjusted to improve contrast and clarity. Sound files were drawn up to accompany the graphics and lessons. All were organized into the script and sent to the programmer to combine into the programming. This process is ongoing until all 22 lessons are complete.

Work Planned for FY 2004: Develop remaining lessons and finish software coding. Send copies out for beta and field testing. Make revisions based upon testing data results. Develop product documentation, final product specifications, and perform final tooling. Duplicate product from the master. Make product available.

Ultimate Low Vision Lamp (Discontinued)

Purpose: To provide students and adults who have low vision, a lamp which emits 300 foot candles of light at a height of 21 inches without giving off substantial heat.

Project Staff: Elaine Kitchel, Project Leader
William Bartesevich, Technical Consultant

Background: For a long time students and teachers have been asking for a task lamp which provides adjustable and adequate light levels without getting dangerously hot. Research, much of it replicated, shows that as a general rule, persons with low vision, especially those with macular involvement, need three times as much light to do fine tasks and reading as a person with typical vision. Until recently, the technology to provide adequate light levels at a safe temperature did not exist. Now APH is taking advantage of the new technology to provide adequate task lighting.

Work During FY 2003: A schedule was determined for the product. Basic design specifications were worked out in conjunction with a lighting manufacturer and the technical designer. The Project Leader received drawings and models from the designer and preliminary revisions were suggested. During the design phase, it was concluded that though the lamp would provide the needed lighting with the heat diffused, it still was too

heavy for use with young students, or for persons with poor motor control. It was decided that the project would be discontinued until technology was available that would enable the product to be less bulky and lighter in weight.

Work Planned for FY 2004: The project is discontinued.

Mathematics

Staff

Magnet Mate Math (Continuing)

Purpose: To enable sighted teachers who do not know braille to convey mathematical formats and expressions to students who are blind

Project Staff: Tristan Pierce, Project Leader
Tom Poppe, Pattern and Model Maker
Rebecca Worrell, Consultant/Product Developer
Frank Hayden, Technical Manager

Background: Fred Gissoni, APH Customer Support Specialist, saw Rebecca Worrell, a math teacher in South Carolina, give a presentation on the *Magnet Mate Math*. He presented the metal board with magnetic braille/print symbols to the PRC in June 2000. It was approved with the stipulation that preliminary field-testing be done to determine the product's usefulness.

Work During FY 2003: An overseas vendor with the specific printing process needed for this product has been identified and samples showing the quality of their work have been approved.

Work Planned for FY 2004: The prototype of the carrying case and magnetic tiles will be completed.

Primary Math Units (Continuing)

Purpose: To develop instructional math materials for use with blind or visually impaired students in the primary grades as either a supplement to the classroom math program or as a core curriculum.

Project Staff: Eleanor Pester, Project Leader
Carol Roderick, Project Assistant
Rosanne Hoffmann, Project Assistant
Jenny Dortch, Project Assistant

Background: The math achievement of blind students has been consistently behind that of their sighted peers. In recent years, very little research and product development has been done to improve this situation. Teachers of students who are blind, however, have continuously requested special braille curricular materials for math similar to those in the *Patterns* programs developed at APH to teach braille reading. Because of the dramatic increases in the number of blind students mainstreamed, the use of the itinerant special education teacher model, the math priority stated in *GOALS 2000*, and new teaching standards adopted by the National Council of Teachers of Mathematics, it became critical

to focus once again on math materials for visually impaired students. This project received special funding as part of a three-year research initiative to develop new products in math, science, and geography.

During the Mathematics Focus Group Meeting in September 1994 this program was discussed, and specifications were determined. Other work on the project included a review of the research and literature on math instruction for visually impaired students; analyses of math curriculum guides; thorough analyses of current textbooks to determine mathematical symbols, terms, and concepts being taught; a search of the catalogs for commercially available math related products; and a review of programs on abacus instruction. By 1996, prototypes of eight *Primary Math Units* and a general guidebook began to take shape with guidance from Dr. William E. Leibfritz, math consultant. In July 1996, a group of teachers of the visually impaired met at APH to share ideas they found to be particularly effective for developing math concepts and practice materials for their visually impaired students in the primary grades. These ideas were incorporated into the strategies for the math program.

In July 1997, project consultants, Dr. Leibfritz and Susan Millaway, met at APH and reviewed in detail the teaching strategies for the kindergarten and first grade *Primary Math Units*. An introductory book that presented the philosophy and an overview of the program and provided information on such specialized topics as adapting materials, using the Cranmer Abacus, and writing the mathematical braille code was developed by the Project Leader. Worksheets were developed to supplement the *Primary Math Units*. Lessons for *Unit 1: Matching, Sorting, and Patterning* for kindergarten through third grade were checked against the original concepts to be taught, and lessons were rewritten to better meet the needs of students who are visually impaired and to better present the concepts being taught. Worksheets for this unit were checked for coordination with the lessons. The number of worksheets was expanded to better cover the concepts presented in the lessons. Plans were made to field test by units rather than waiting for the program to be completed. Tooling of Unit 1 prototype worksheets for field testing began.

Work During FY 2003: The Introductory Book and Lessons for *Unit 1: Matching, Sorting, and Patterning* were finalized. Evaluation forms for the Introductory Book and for Unit 1 Lessons and Worksheets were developed. Production of the Unit 1 materials is scheduled for completed this fall. Evaluation sites are being sought and contacted.

Work Planned for FY 2004: Materials will be placed with teachers having braille reading students in kindergarten through third grade for 2-3 months. Data from the field testing will be analyzed, and the materials will be revised for production as needed. Units 2, 3, and 4 will be prepared for field testing next.

Quick Pick Counting (Continuing)

Purpose: To explore the effectiveness of using sets of *Quick Pick Counting* with blind and visually impaired students.

Project Staff: Eleanor Pester, Project Leader
William W. Armstrong, Project Assistant
Carol Roderick, Project Assistant

Background: As part of the Elementary Math Aids project, APH produced braille/print versions of *Quick Pick Addition*, *Quick Pick Subtraction*, *Quick Pick Multiplication*, and *Quick Pick Division*. Another set of materials, *Quick Pick Counting*, can be used to introduce counting with tactile symbols. This is an important step that should directly follow exercises in which students count real, concrete objects. For the tactual learner, however, this step is often omitted. Since illustrations used in textbooks can be very difficult to interpret tactually, the early levels of the textbooks are often not produced in tactile format at all.

During FY 2000, preparations were made for field testing *Quick Pick Counting*. Prototype copies of *Quick Pick Counting* for evaluation were developed. Production of copies for field testing was begun. An evaluation form was drafted. In FY 2001, evaluation forms and procedures were finalized. Because of unanticipated delays caused by production problems, prototype copies for field testing were not ready until school was out for the summer so field testing began at National Federation of the Blind (NFB) Kids Camp and Kentucky School for the Blind (KSB) Summer School. In 2002, field testing occurred in Tennessee with young academic students, multiply handicapped students, and older developmentally delayed students. This completed the field testing which pointed out that the braille needed to be printed a little farther from the case to make reading easier and that heavier paper would be preferable since it would be more durable. In preparation for production, a number of paper samples were brailled, printed, examined tactually, compared for cost, and a different paper was selected in an effort to improve the quality of this product. The final copy was prepared for production. Production specifications included raising the braille one more line above the case for easier reading.

Work During FY 2003: Tooling for production of *Quick Pick Counting* began with print and then braille followed. Production is scheduled to be completed this fall.

Microcomputer Applications & Products

Larry Skutchan

APH Digital Audio Component (Continuing)

Purpose: To create digital audio recording, playback, and navigation components for use in several educational, application, and utility programs under development.

Project Staff: Larry Skutchan, Project Leader
Rob Meredith, Programmer
Carol Stewart, Advisor
Steve Mullins, Advisor
John Zinninger, Advisor

Background: With the close work APH does with the Digital Audio Information System (DAISY) consortium, the National Library Service (NLS), and its own needs, both in a professional digital studio application and in educational software under development, it quickly became apparent that a core set of digital audio recording, playback, and navigation (DARPAN) services that were robust and reliable needed to be deployed.

Several of the educational software projects in development, including *Book Wizard*, *Talking Typer*, *Termite Torpedo*, and *Teacher's Pet* require a digital audio recording and playback component. In addition to its needs for playback and recording controls, the *Book Wizard* project required navigation controls and the ability to speed up the playback of the recording without effecting the pitch as happens with analog playback equipment.

Given the diverse requirements and the interesting possibilities offered with custom software, APH decided to develop its own digital audio record, playback, and navigation component for use with several projects underway and to develop an interface that uses that control to provide a studio recording application. Programmers met with studio staff to refine and prioritize the requirements of a digital recording application for use in the studio. They delivered the first prototype of an application for testing, comments, and quality testing in March 2000. The programmers observed recording sessions, gathered feedback from engineers, narrators, and monitors, and introduced revisions, corrections, and enhancements. This studio-recording program has become known as APH *Studio Recorder*.

Work During FY 2003: Programmers made a number of internal enhancements to Digital Audio Recording Playback and Navigation (DARPAN). These included greatly enhanced functionality to the mark facilities. See *Studio Recorder* for more details.

Another area of advanced research that proved useful was a detailed analysis of the pause patterns of a particular narrator. Programmers added this functionality into DARPAN and it permits the phrase detection algorithms to make a more intelligent decision about what constitutes a sentence, paragraph, and section break in an audio work not specifically prepared for the DAISY format.

Work Planned for FY 2004:

- Add normalization capabilities
- Add volume control that lets the user change the volume and save the results

There are still several advanced features that require significant amounts of research to implement. Among these are the addition of noise floor detection, a band pass filter, pattern detection, and some advanced functionality in *APH Studio Recorder* that prepares all four sides of a cassette for the digital bin that is used to make the cassette copies of a tape. One expressed need is index tone detection from an external source. The component already knows where the tones it has inserted into the material are located, but the ability to detect tones from an external source will provide the ability for *Book Wizard* to import a cassette tape and convert the existing index tones into heading markers or page markers for a digital distribution of a talking book.

Staff needs to study the implementation details of Windows Coder/Decoder (CODECS) drivers and deploy APH's time scale modification algorithms as a CODEC. This provides the opportunity to offer this technology to the end user and to make the technology available from within other commercial applications that may not actually know anything about Time Scale Modification (TSM), but that support the use of CODECS. The programming group thinks writing band pass filters as CODECS makes the most sense, especially given that the code base becomes much more reusable when deployed in this manner. Such pattern detection also opens up other interesting possibilities. These include the ability to find an unusual sound, to identify and find a particular word or sound, and possibly the ability to replace one sound with another.

The programming group would like to enhance the new TSM algorithms to take advantage of the new phrase detection algorithms to remove pauses between phrases when the user requests compressed speech. Some reports claim that listening material can contain 20% silence. The TSM also deserves significant attention in several respects including finding ways to make it more consistent among different narrators, getting it more intelligible at greater speeds, adding expansion capabilities, and researching differences between real human speech and processed speech at fast rates. Yet another area of interest is streaming technology. The digital audio component should provide full streaming services to the client in a variety of environments. Server side implementations of the component should be able to provide a local user navigation and time scale services on the server side, thereby reducing the amount of data that gets transferred.

APH Speech Environment (Continuing)

Purpose: To develop a reusable foundation for current talking software from APH.

Project Staff: Larry Skutchan, Project Leader/Programmer
Rob Meredith, Programmer
Keith Creasy, Programmer
Mario Eiland, Programmer

Background: APH is developing new talking software that runs under current and future versions of Windows. While each completed title is different, they also have much in common, especially with respect to access issues. The *APH Speech Environment* (ASE) provides the following common services to all the programs under development:

- speech or braille output
- controls to select speech and braille parameters
- record and restore user access settings
- accessible output to standard Windows menus and controls through an interface to Microsoft's Active Accessibility (MSAA) components
- standard interface to speech controls and enhancements to standard text-to-speech (TTS) engine behavior targeted for use by blind and visually impaired users
- precise punctuation control and consistent rendering among various text-to-speech engines
- interactive TTS engine selection
- interruptability
- detection of demonstration versus registered program with an interface to accept and store registration information
- dictionary translation
- digitized audio playback control, including the ability to generate studio scripts of a program's prompts and an interface that uses those recordings for program interaction and control interactive contracted braille

ASE is a program module that provides these core services. While it will not be a stand-alone product, it is included as part of most APH software developed for Windows and could be provided to other accessible software manufactures in an effort to meet the 508 regulations referring to government procurement of electronic tools.

During the first few years of APH software development, standard services were enough to meet the needs of the software under development. For example, providing access and speech to common Windows controls and menus, a means of controlling speech parameters and voice selections, a means of stopping the speech on request, a way of repeating the information, and precise punctuation pronunciation control were once enough to meet the needs of the applications under development at APH. As more

titles gain popularity, *ASE's* capabilities must expand to meet the needs of the new software.

In APH's first three titles, for example, the software was all written in C or C++ programming languages, and none of the packages required the ability to echo keyboard input, although each provided this functionality. Neither did the titles have much need for braille output. *ASE's* role has already expanded with the introduction of a user registration mechanism. These algorithms let the application query registration information and inform the application as to whether it is running as a demo or as a full version. They also provide a user interface that describes the limitation built into the demonstration version of the calling application and offers the user the ability to enter a key that he may obtain from APH customer support over the phone or electronically. Customer support representatives use an application written by research programmers to generate a unique number derived from two pieces of information--the name of the program and the customer's name or email address. Once the customer enters that unique number, the application is converted from a demo into a fully registered version of that program.

Now, as APH experiments with development under different programming languages and with the need to provide these technologies to other companies that wish to license APH's software, the flexibility of *ASE's* interface must be improved. The first version of *ASE* was packaged as a standard Windows Dynamic Link Library (DLL). This is an extremely efficient means of passing large amounts of information from one component to another. Unfortunately, this technique is feasible to use only with the C programming language. As *ASE's* capabilities expand and the demands on it from client software expands, *ASE* required moving to the Component Object Model architecture. About 80% of *ASE's* functions have been converted to this architecture, and several educational software products are already taking advantage of *ASE's* new interface and capabilities.

In addition to its first focus on speech access, *ASE's* progress in braille is equally important and essential in future endeavors. APH purchased the source code to a well-known braille translation program that runs under DOS and began converting it to Windows and adding functionality.

Programmer Keith Creasy converted the DOS source code from Easy Braille to run under Windows. He then wrote an interface using the Component Object Model (COM) so that access to its services could be flexible. This way, while the braille object can be part of *ASE*, it is also available as a stand-alone component for those applications that do not need speech services or for those applications that might need more precise control of the translation process. Creasy also wrote support algorithms that let the translation object take multiple translation tables and to change translation tables on demand.

Programmer Mario Eiland took charge of Easy Braille's translation tables. He wrote a new reverse translation table that transforms contracted English braille into plain English text. This process is necessary for several projects including *Book Wizard*, where it will be

used to precisely coordinate the cursor positions among multiple views of a book. Eiland also enhanced the forward translation table to properly handle email addresses and Web addresses.

Larry Skutchan wrapped a COM interface around *ASE's* functions and added several new methods and properties to the new interface.

Programmers wrote cursor synchronization functionality into the translation object so it is now possible for *Book Wizard* to get the information it needs to keep the large print and braille views of a document synchronized.

Work During FY 2003: Programmers made significant enhancements to the reverse translation table for the translator. They incorporated the translation object into the *Book Port* Transfer software. Programmers added capabilities to detect beta versions of APH software.

Work Planned for FY 2004: Programmers will add key echo functionality to *ASE* and will examine what it takes to provide that keyboard feedback with digitized human speech, as well as, adding speech feedback for word by word cursor movement in edit controls. The programmers will add speech support through *ASE* for two new controls--the Rich Edit control and the HTML document object model through the Internet Explorer-Server control. These two controls are in use in the *Book Wizard* program (see separate write-up) and intelligent speaking cursor algorithms will need to be developed.

Book Port (Completed)

Purpose: To provide a hardware tool for reading electronic books in a means convenient to the student and professional.

Project Staff: Larry Skutchan, Project Leader
Steve Gomas, Project Consultant
Rob Meredith, Programmer
Keith Creasy, Programmer
Tessa Wright, Project Assistant
Rosanne Hoffmann, Project Assistant

Background: In FY 2000, APH began distributing a device that uses synthesized speech in a portable, convenient housing to let the user read electronic books. This device, the *Road Runner*, is no longer available. *Road Runner's* popularity and utility were unsurpassed, especially for those students and professionals who had large amounts of material to read.

Research staff began planning enhancements to the device and its interface

immediately. So, when its unavailability became apparent, staff began design on a new device that addresses the shortcomings of *Road Runner* while building increased functionality and flexibility for the future. These new issues included: increased, removable storage media, incremental deletes, more file types, better navigation and review, and a simplified interface. The unit needs to be able to accommodate memos, so the number of keys was increased to allow braille input for making annotations. The unit also needs to be able to play digitized audio so that it may play Digital Talking Books.

One of the focus groups at the 2001 APH annual meeting concentrated on the idea of creating a tool that consisted of a *Road Runner*-like device that contains the dictionary. Participants in the session were highly favorable and excited about such a possibility, and given the large, removable storage capabilities of *Book Port*, the concept is easily incorporated into the *Book Port* device.

Given the expensive and time consuming process of creating a new hardware device from scratch and writing its associated software, APH partnered with another company to use its hardware base with the specific needs identified by customers, experts in the field, and focus groups comprising both experts and consumers. The *Book Port* is a device based on the hardware from that company combined with software written specifically for APH.

Book Port is a portable device designed to read electronic books to blind students and professionals. Measuring only 2.75 X 4.75 X 1 inches, its small size, large storage capacity, and battery operation make it the perfect hand-held device to take reading with you wherever you go. *Book Port* features its own high quality text-to-speech synthesizer (for reading electronic text and Web pages) and it plays digital audio files such as MP3 and DAISY Digital Talking Books.

Book Port contains state-of-the-art hardware such as a universal serial bus connector (USB) to make the connection between the device and your PC as simple as possible and a Compactflash[®] card slot for removable mass storage. It contains a built-in microphone and supporting hardware to let you record and playback your own memos on the device. *Book Port* features its own date and time clock and a sleep timer that automatically turns off the unit after a predetermined amount of time in case you fall asleep while reading.

The software that comes with *Book Port* makes it easy to send documents and Web sites from your computer to *Book Port* without leaving the application in use, and it provides capabilities especially geared toward blind students and professionals. Such enhanced capabilities include multiple levels of phrase detection for spoken word content digital audio files and reverse translation for electronic contracted braille files such as those found on Web Braille. Digital Talking Books such as those from www.Bookshare.org and Recordings for the Blind and Dyslexic get sent to *Book Port* as if the device were especially designed for them. Sending Web pages to the device for portable reading is as easy as right clicking the Web page, and then choosing Send to *Book Port* from the

context menu that appears. You may also send files directly from Windows Explorer by highlighting the file or files, picking Send To, then selecting *Book Port* from the Send To menu. And, best of all, if the unit doesn't happen to be connected when you need to send a page or file, the software queues up the material and sends it the next time you connect *Book Port* to your computer.

The software used to send files from your PC to *Book Port* shows a preview of the content of the files you highlight, so it is easy to decide what to send by more than just the name of the file. In addition, if the file contains digital audio, the software lets you hear the contents of that file, and the preview window shows statistics about that file. If the file is contracted braille, the preview window shows the reverse translated version of the first portion of that file. When you plug *Book Port* into the USB port, the software automatically starts, and it remembers the last folder from which you sent files, leaving you in position to immediately begin picking more files to send.

This device became available in June 2003. More information is available at www.aph.org/tech/bp_info.htm.

Work Completed in FY 2003:

- Engineers refined specifications, as more information became available.
- The feature set was trimmed down to provide a realistic delivery date.
- Programmers wrote, debugged, and tested the *Book Port* Transfer software.
- Programmers wrote file filters for braille, html, Word, text, and DAISY 2.x and 3.0 files.
- Staff sent several prototypes of the hardware and software to field test sites, and they rewrote any identified issues.
- Staff wrote the documentation and finalized the product.

Work Planned for FY 2004:

- Staff plan several enhancements to the firmware and software.
- Some hardware changes are also anticipated.
- Adding hardware to support time scale modification is at the top of the list. This provides the unit with the ability to speed up the playback of audio content without distorting the pitch.
- Support for Audible.com files.
- Braille input for search subjects.
- Alarms.
- There are also several minor bugs that need to be addressed.

Book Wizard (Continuing)

Purpose: To provide a program that lets a student read textbooks using the National Industry Standards Organization (NISO) 3.0 Digital Talking Book (DTB) file specifications in whatever accessible format is most appropriate for that student. It also provides navigation and control to exploit the capabilities provided by the new format and to provide simple, efficient tools for creating these books.

Project Staff: Larry Skutchan, Project Leader
Keith Creasy, Programmer
John Hedges, Programmer
Rob Meredith, Programmer
Jane Thompson, Advisor

Background: The need for a program that supports multiple output media arose from several places, including APH's and other accessible media publishers' desire to efficiently produce textbooks in the media that best meets a student's needs. Such a task requires intelligent software and a file format that is both universal and expandable.

The first step in creating such software is to identify or define the file format that best supports the characteristics required by all the output media types. Careful analysis and a worldwide trend to the extensible markup language (XML) convinced staff that this file format provided the structure, features, and extensibility required. The existence of math markup languages such as Math Markup Language (MML) and LaTeX also provides the possibility of integration into the final file format.

XML uses a Document Type Definition (DTD) to define the vocabulary for a markup language, and these DTDs can become quite elegant and elaborate. Creating one from scratch is not a trivial task.

The National Library Service (NLS) is also attempting to define the file format for digital talking books of the future. They put a committee together to study DTDs and requirements for digital distribution of talking books in the United States. The committee consists of talking book libraries from around the world, alternative media producers, schools and training centers, and experts from the World Wide Web Consortium (W3C) to identify and define the parameters of this file format. A large part of this committee is represented by the Digital Audio Information System (DAISY) Consortium, which is another group comprised of alternate media producers from around the world. Their mission was to create a digital distribution system that met the needs of the users and producers and one that would be compatible from country to country. European, Australian, Canadian, and some Asian countries are already using the DAISY 2.x file specifications to produce and distribute digital talking books.

When NLS first commissioned the study, they were mainly on a quest for

information about how to produce and distribute digital talking books for United States citizens, and this is still their primary goal. But as the process evolved and their needs coincided so well with the needs of many others, they soon found themselves, under the leadership of Michael Moody, defining the standards. They are working through the National Information Standards Organization (NISO) to define the characteristics of a file format that will meet the needs of all these producers, as well as the end user, provide compatibility among countries, and remain extensible to provide the option to grow. The file format they chose uses a number of existing technologies, so it will be possible to create tools and applications to work with such files much more easily than if they had defined their own file formats.

The new file format was submitted to the National Information Standards Organization, and it gained approval in December 2002. The format is called NISO z39.86. The NISO Digital Talking Book combines Simultaneous MultiMedia Integrated Language (SMIL) 2.0, with a DTD that defines the elements in the text, and an XML file called the Navigation Control to tie the parts together. The Open Ebook's package file, which contains a list of all of a book's associated files, is also included.

Having attended the meetings defining the standards and insuring APH's interests were represented, research programmers gathered information about the issues and technologies and wrote specifications for a software package that uses the NISO Digital Talking Book Document Type Definition. These standards are integrating the audio representation of a work to let a student read a textbook in whatever media he desires. The package, *Book Wizard*, also provides services to make it simple and efficient to create such a book. Keeping all this in mind, staff are also aware that using a hand held device like the Compaq Ipaq or other Personal Digital Assistant (PDA) to read digital talking books is also required. Staff used the *Book Wizard* services to permit reading NISO z3986 Digital Talking Books on *Book Port*.

Staff continued to participate in NISO and DAISY consortium activities and, as they learned more about specific APH requirements, insured specifications were defined to meet these requirements. Creasy created a view menu and algorithms to display a DAISY book in whatever formats the book supports. He also created a navigation control that displays the book's Navigation Control file in a standard Windows tree view control. He then added functionality to edit the labels in the Navigation tree and write the results to the Navigation Control file. This makes the process of creating a new book from an existing recording or from live narration very simple. He wrote algorithms that feed the braille translation object a paragraph at a time.

Earlier versions fed the translation object the entire work at once, but programmers quickly realized that a much more efficient and flexible technique is to keep a running translation. This includes formatting considerations, up to the paragraph before the cursor, then translate only what is left to display on the screen from the beginning of that paragraph down toward the end of the book. This part of the translation, of course, must be recalculated with any change in the text, but cursor movement activities, except when

the user option, Do Not Translate Current Word is set, require no call to the braille translation object, and this functionality was incorporated into the project. Staff also noticed that translation times quickly become a critical component of the equation.

Creasy wrote support for importing files of various formats and incorporating those files into the book. He wrote functions to create a new book and use an imported file as part of that book or to record directly into the book. He also added the ability to control the record, playback, navigation, and view switching functionality. This includes intelligence to tell if a book has been marked up at the paragraph level, and if it has not, provides navigation to the paragraph level through the phrase detection algorithms in the digital audio component.

The programmer added bookmark support to *Book Wizard* so that the program remembers where the user last read in a particular book and he added support so that each book maintains the windows and positions of those windows. He wrote functions that allow the technician to view and/or edit the source file that controls the DAISY book. When the user selects the edit option in the View menu, he sees a submenu of all the files contained in that book, and he may go directly to any of those files to view the underlying tags for that particular file.

The programmer designed dialogs to gather information about a book's metadata and he wrote routines to save this information with the book. The metadata provides the information that lending libraries and other entities use to identify books at a user's request. He added support for importing text files into the DAISY format and wrote controls and supporting algorithms to enable speech synthesis as a method of reading the book. These text file importation features, for the first time, let producers directly import text files with a default intelligent interpretation of the information contained within.

The programmer also wrote functions for importing HTML as a foundation for the book where the software actually builds the XML and NCX files straight from the HTML source. He wrote functions for navigating through the large print view of the book including single character, screen line, sentence, paragraph, page, and directly through the navigation control contents file.

The programmer began writing functions that interpret the user adjustable tags (like footnotes, page numbers, and producer notes), render the book with respect to those elements, and gather user preferences for those elements. These user preference functions, of course, were accompanied with user interface facilities to support them.

The programmer kept codes and sample books current with revisions of the DAISY/NISO specification, which has been under development. He added an audio view that allows for presentation and better control of audio material. He added features for recording and marking up audio to the DTB3 specification, along with the ability to import raw audio files and create a very basic DTB3 book. He continues the research and development of text presentation and editing features for future implementation.

Work Completed in FY 2003: Programmers added support for distributing *Book Wizard Reader* with a specific book. This lets APH distribute a Digital Talking Book along with the software to read that book, even if the user does not already have the *Book Wizard* software. Programmer Keith Creasy added support for the automatic software update program developed for APH software.

The programmers added the following features:

- ✿ Dialogs for entering and editing the Metadata of a book. This is information about the book that might be used to locate certain material and gives other information about the book that may or may not need to be presented to the reader. The NISO 39.86 specification gives very specific details for what metadata must be present in a compliant DTB.
- ✿ Support for renaming the output files when building a distribution copy of a book. This was done to support publishers such as NLS who have specific guidelines for how files should be named. The files that were part of the DTB had to be saved to a different name and all references to those files in the DTB itself also had to be altered to match the new names.
- ✿ Support for the ZedVal tool that validates NISO Z39.86 (DAISY3) books. The validator can be launched from the Tools menu of *Book Wizard Producer*. Extensive testing was done and corrections made where necessary. *Book Wizard* will now produce books such as the issues of U.S. News & World Report with no validation errors.
- ✿ Functionality to *Book Wizard Producer* that allows both audio and SMIL files to be split up into smaller chunks. The purpose is to make book content load faster from Web sites over slow connections and to making the loading of very large books faster even when loaded from local storage such as a CD.
- ✿ Functionality to *Book Wizard Producer* to automatically match audio marks placed in audio files using *Studio Recorder* with headings in imported HTML. This is the method used to create the issues of U.S. News and World Report, and it will probably be used widely as a common way of producing audio books with a navigable table of contents. It may also be used to produce books with full audio and full text.
- ✿ Produced weekly issues of U.S. News & World Report as a pilot project for the National Library Service. These magazines were placed on a Web (http) server where they could be tested for the feasibility of delivering content on-line.
- ✿ Support for the *Book Port*. Text and audio DTB's can now be sent directly to the *Book Port* using the *Book Port* transfer software which calls *Book Wizard Reader* with special command-line options designed for this purpose.

- Functions to allow for setting, clearing, and moving between bookmarks. Bookmarks are stored in the bookshelf for each book. He added separate controls for audio and text-to-speech volume.
- New features to the bookshelf and the bookshelf dialog. These include adding paths that are on remote Web (http) servers, explicitly opening files with the browse button, and displaying titles rather than file names on the recent file list.
- A dialog for playing special messages such as the opening of a book or messages provided by the producer of the book. This dialog uses a SMIL file along with HTML text and optional audio.
- Functionality to *Book Wizard* to handle protected digital talking books (PDTB's). These books are encrypted and keyed for protection of intellectual property and for preventing unauthorized users from reading books that they do not have permission to use.
- Functionality to *Book Wizard Producer* to break imported HTML down into sentences and phrases so that books with finer synchronization of audio and text can be produced.

Programmers Keith Creasy and Rodger Smith produced a book for the White House Historical Association and NCR IDEAL, containing short biographies of the U.S. Presidents and First Ladies. The book also contains a virtual tour of the White House. The production of this book was of great value in working out issues related to *Book Wizard Producer* and the production process for digital talking books (DTB's) in general.

Work Planned for FY 2004: *Book Wizard* staff will continue to work in cooperation with the recording studio and eventually with other departments within APH to produce material and work out production issues related to DTB's.

Functionality for reading large books with multiple SMIL files will be rewritten to allow for greater flexibility and faster loading. Special modes for creating and reading tables in DTB's will be added to both *Book Wizard Reader* and *Producer*.

Functionality will be added to *Book Wizard* to support dynamic links contained within books. A new view will be added specifically for the presentation of images and will be synchronized with the text and/or audio.

Functionality will be added to allow for user response to items in a DTB when called for. This should allow a DTB to be used for interactive teaching and computerized testing. Additional features will be added to the contents view to allow editing of the entire structure of a DTB in *Book Wizard Producer*. The text view will be enhanced to allow the entering and editing of text in the producer and for character, line, and word navigation through the textual content of a book. The feature used to automatically mark up a book

using audio marks will be enhanced to make use of all 11 custom marks.

Support will be added for adding lists, list items, block quotes, footnotes, annotations, and other elements not yet supported to a DTB. The cursor used in the text view will be synchronized with the cursor in the braille view for simultaneous editing of both text and braille. A Wave View such as the one used in *Studio Recorder* will be added to *Book Wizard Producer* to give a more intuitive visual interface.

Support will be added for Cascading Style Sheet (CSS) to define the visual presentation of textual material.

Future long-term enhancements include the following:

- Features to produce hard-copy books in braille and large print.
- Direct support for braille displays.
- Speech recognition capabilities that will allow a narrator's recording to be automatically synchronized with a provided full-text of the content.
- Interactive validation and error correcting features.
- Enhanced library and project management features.

The programmers will continue to write code that performs the functions and capabilities outlined in the specifications. Hardware drivers, reproduction capabilities, and library management functions are among the more time consuming components remaining. Programmers will write a new Windows printer driver to address the deficiencies in the generic text driver provided with Windows that will permit embossing to a variety of devices.

Programmers will develop refreshable braille drivers for several popular commercial displays. These drivers also make it possible for trained and qualified proofreaders to make corrections directly to the original file.

Programmers will develop tactile graphics embossing support and applicable drivers for the corresponding hardware. This work includes an analysis of the requirements and capabilities of the available devices. While several devices support the capability to provide simple tactile graphics, others, like the Tiger 1000, support capabilities way beyond what previous devices have supported.

The programmers will examine the feasibility of creating drivers that use one image and provide code that transforms the vector graphic or bit map image into a series of printer escape sequences that gracefully degrades or expands as the device's capabilities degrade or expand. If feasible, the programmers will write such drivers. If it is not feasible to support the use of a single image for all possible devices, programmers will write specific drivers for specific devices and add the capability to select among images

given the specific output device. They will write formatting algorithms for both the large print and braille hard copy options. These formatting functions require the material to be rendered with respect to the style sheets in use and any XML tags that may include a Media attribute that could include or exclude parts of a book. They will add image display support. This may include intelligence to select an appropriate image based on the media output. They will add functionality to the braille translation component to support forcing characters to upper case in the reverse translation, respect XML tags to control the formatting and translation process, and work on stylesheets that take braille's unique formatting requirements into account.

The *APH Speech Environment (ASE)* needs to be updated to support Rich Edit controls and the HTML document object model, and those features are on the books for the *ASE* project. They will incorporate library checkout and check-in facilities and remote server support. This makes it possible for two editors, both in remote locations, to work on the same book. This collaboration process is expected to be an effective means of getting more complex books to students more quickly.

A version of *Book Wizard* that focuses on digital audio will be finalized this year. This product takes the form of one program for reading that will be available at low cost and another version with all the creating facilities, that will be made available for a somewhat higher price.

Math Flash (Completed)

Purpose: To develop a talking software program that provides math drill and practice in a flash card format.

Project Staff: Larry Skutchan, Project Leader
Rob Meredith, Programmer
John Hedges, Project Assistant
Rodger Smith, Project Assistant
Kris Scott, Project Assistant

Background: *Math Flash* is a talking software program that runs under Windows. Professionally narrated digitized speech and an animated character present math problems in a flash card format and respond with fun positive and negative feedback. The program lets the teacher specify the kinds of math problems to use and the ranges of the numbers. It allows the use of the four basic arithmetic functions in any combination, as well as the use of positive and negative numbers. The teacher can also allow division with or without remainders. *Math Flash* generates the problems randomly, or the teacher can use specific problems and save the preferences to disk. The program offers three main modes of presentation. Drill mode allows the student to practice problems and offers feedback after each answer is entered. Test mode presents the problems, but does not give feedback on

the results until all problems have been completed. Auto mode presents problems, pauses for a group of students to shout out an answer, then gives the correct answer and moves on to the next problem.

Work During FY 2003: Final enhancements were completed, documentation was finalized, and the program was field tested. Project staff finalized the documentation, the Setup program, and the code and recordings for the application and prepared the product for production. *Math Flash* received Quota approval from Research and Development Committee (a.k.a. Educational Products Advisory Committee) members and became available from APH in spring 2000. It has been a tremendous success and captures the attention of children and adults alike, both sighted and visually impaired.

Project staff continues to solicit feedback from teachers, parents, and students about *Math Flash*. Some of the most commonly requested features and functionality include:

- the announcement of correct answers in the test review section of the problem where the student answered incorrectly, and
- a means of letting the user navigate through complex mathematical equations with the cursor keys, much like one does with a word processing program, except this would be equation processing functionality.

Programmer Rob Meredith added the announcement of the correct answer when reviewing an incorrectly answered problem in a completed test as suggested by user feedback. Meredith found and fixed a bug where it was possible to enter the negative sign, immediately followed by an R for a remainder.

Work Planned for FY 2004: This project is complete. Updates and enhancements will continue as the need arises.

Money Talks (New)

Purpose: To create a financial management/check book software package that is totally accessible and provides basic checkbook features that off-the-shelf programs cannot provide.

Project Staff: Mary T. (Terrie) Terlau, Project Leader
Larry Skutchan, Software Engineer
Rob Meredith, Programmer

Background: Keeping bank account records on computer provides a reliable method of maintaining check registers and account balances. Commercially available bank

account management software presents some access obstacles to experienced visually impaired computer users and is not accessible to persons without specialized training and expensive access software. *Money Talks* is designed to perform the full range of functions needed by blind and visually impaired persons, to be fully accessible with speech and large print output independent of screen reading and magnification software packages, and to be used by persons who have little or no formal training in the use of computers.

Work Completed in FY 2003: Programmers studied the protocols necessary to make getting information from on-line banks into *Money Talks*.

Work Planned for FY 2004: Continued coding, testing, and finalizing the design will be the top priority for the first quarter of 2003. Next, after internal quality control, the documentation will be written, and the software will be submitted to the field test process. Once field testing is complete and revisions have been made, the software will be turned over to production for duplication and distribution.

Monitoring Technological Developments and Educational Applications (Continuing)

Purpose: To identify and develop microcomputer materials that support educational needs, to monitor technological developments and educational applications of technology, and to disseminate information on current uses of technological aids.

Project Staff: Larry Skutchan, Project Leader
Rob Meredith, Programmer
John Hedges, Programmer
Keith Creasy, Programmer
Mario Eiland, Programmer
Rodger Smith, Programmer
Kris Scott, Project Assistant

Background: The rapid advances in use and development of software, hardware, accessibility considerations, and educational theories require significant attention. The Technology Group in the Educational Research Department monitors and participates in numerous activities to keep abreast of developing trends and current implementations and encourages trends, policies, and standards that use technology to promote APH's mission. These ongoing endeavors help keep APH personnel knowledgeable and influential in the areas of regular and assistive technology.

The Technology Group stays informed through participation in numerous listserves focusing on programming and accessibility issues. The group actively uses and beta tests pre-releases of operating system code, key applications, active accessibility, Java Swing

components, screen enlargement, and speech or braille output accessibility aids. The group attends conferences, presents products and activities, and demonstrates APH products related to technology. The Technology Project Leader and two of the programmers are also members of the DAISY Consortium to help ensure that APH is ready for the conversion to digital talking books and that APH is represented in the shaping of guidelines and specifications.

In its efforts to influence direction, the Technology Group creates software for both internal research and use as direct products, applies expertise to help make APH effective and accessible in its production of braille and large print and its application of new and emerging technologies to these processes, and disseminates information to APH and directly to users. The group promotes accessibility within APH by establishing techniques that make the entire company accessible.

Work During FY 2003: Staff worked closely with the studio in order to create an efficient means of creating Digital Talking books. They created several sample books including *Presidents of the United States* and *Verbal View for Windows XP*.

Staff began a pilot project with the National Library Service to create digital talking books (DTBs) of US News and World Report. See the *Book Wizard* write-up for information on how the program was modified to deliver content straight from the web.

With the increasing number of projects and products from the Technology Division, it quickly became apparent that some project management tools were necessary. To this end, staff found a new software deployment tool, Inno Setup, and created scripts so that each developer could create his own deployment package with a single command. Scripts were also written to create new projects that created all supporting files and shells of the documentation.

Keeping track of all the activity on all the projects is also becoming increasingly difficult. To address this issue, staff searched for some kind of bug tracking software, but ended up writing their own. This new program is called *Track It*. This package notes each issue associated with a project along with that issue's solutions. This connects the programmer, manager, and anyone else interested in the progress on a project.

One other critical area that needed addressing was the issue of appropriate testing. Staff designed and wrote the software to support an on-going beta system, so they can distribute pre-release versions of upcoming software to a wider audience.

The Technology Group continued to participate in beta testing, monitor listserves, attend conferences, collaborate with other developers, and disseminate information. It also continued to study effective means of combining APH's Large Print and Braille areas to accommodate digital text and digital talking books.

Technology staff provided advice and expertise at Product Advisory and Review

Committee (PARC) sessions, evaluated products submitted to APH for possible production or sale, helped ensure the accessibility of APH's web site and online ordering systems, and participated in modernizing APH's recording studios.

The Technology Group regularly provides advice and technical assistance to APH's Business Contract Department and meets with staff from Customer Relations to familiarize them with new products as they near their introduction date. Staff regularly consults and assists with technical or information requests via phone and e-mail.

Project staff maintained and updated the demo CD that contains demonstrations of software, product information, and in depth audio demonstrations of software and hardware narrated by experts from the department on that product. The CD interface is HTML based, so it is also used on the APH Web site.

Project staff continued creating APH's own animated characters for use with several APH educational software packages. A new guide dog character, Dot, was finalized and incorporated into *Math Flash* and *Teacher's Pet*.

With three staff members on the DAISY Mark Up and Specification team, the group actively used the specifications and worked to improve weaknesses in the specifications. The Project Leader is a member of the File Specification Group of the American Foundation for the Blind's Solutions Forum, the Kentucky Department of Education's Computerized Testing Task Force, and a member of a task force designed to study tools and techniques that help publishers meet the needs of blind students when providing electronic files of their textbooks.

Project staff created CDs with a setup program and html documentation for the following projects:

- *ISAVE Protocols*
- *Tactile Graphics Kit Guidebook*
- *Time for Art*
- *Loving Me*
- *Teaching the Student with a Visual Impairment*
- *Test Access*

Work Planned for FY 2004: There are two additional areas of software development that require addressing: automated testing and error reporting. The group will find ways of appropriately addressing these issues in the coming year.

The Technology Group will increase its involvement in the following:

- digital document access;
- web streaming technology;
- universal design concepts, and alternative user interfaces;

- ensure critical accessibility of system components and emerging systems;
- disseminate information and advise government, manufacturers, and consumers about accessibility issues;
- and develop high quality, educationally sound software solutions for blind and visually impaired students and adults.

The Technology Group will continue to pursue ways of applying technology to the production of tactile graphics, help educate other Project Leaders in the Department of Educational Research, and look for ways to use technological solutions to further APH's mission. The group will pursue funding for special projects and experiment with emerging technologies. The group also plans to continue expanding the APH network site license and pursue additional text-to-speech engines for possible distribution.

The technology group plans to work closely with the Accessible Tests Department by providing technological solutions to test access issues as defined by them. Advise, review, support, and software design and development are among the expected activities that will connect the Technology Group and the Accessible Tests Department.

More involvement with the Linux operating system and the accessibility developments in the console, X Windows, and GNU Network object model Environment (GNOME) are a high priority. Staff is especially interested in Speakup, the Linux kernel screen access program and its compatibility with software text-to-speech systems under Linux.

Studio Recorder (Completed)

Purpose: To produce a simple-to-use, robust digital audio recording tool geared toward spoken word content.

Project Staff: Larry Skutchan, Project Leader
 Rob Meredith, Programmer
 Carol Stewart, Studio Director
 Steve Mullins, Assistant Studio Director
 John Zinninger, Studio Engineer
 Dave McGee, Studio Engineer
 Monica Coffey, Project Assistant
 Kris Scott, Project Assistant
 Roseanne Hoffman, Project Assistant

Background: *Studio Recorder* is a powerful digital recording and editing software package geared to make recordings of the spoken word. It includes features not found in audio recording and editing programs primarily designed for music production. Such

features include:

- Speed up playback with no pitch distortion.
- Three levels of phrase detection.
- Index tone generation and removal.
- Instant open on large files.
- Instant cut, copy, paste, and delete.
- Intercom functionality.
- Simple user interface.
- Accessibility for blind and visually impaired users.
- Multiple user marks and notes.
- External controller support.

Studio Recorder was originally written for internal use at APH to serve as a tool for creating direct to digital audio recordings for the National Library Service (NLS). It contains many features that ease the task of recording, editing, and proofreading audio books. It also includes features that simplify the production of analog cassette tapes from the digital master.

While *Studio Recorder* was originally written for use by the professional narrator and narration monitor, its simple operation makes it ideal for nearly anyone interested in recording, editing, and producing spoken word audio documents in an efficient manner. In addition to all of the benefits of digital recording and playback technology common to digital recording software, *Studio Recorder* provides unique capabilities geared to both spoken word content and, more specifically, recordings intended for distribution on audiocassette or via the World Wide Web. The software supports projects ranging from the quick and simple home recording to the most demanding and professional task.

Features such as the intercom mode allow recording professionals, who often collaborate from separate booths, to communicate through the PC's speakers and sound card. Other features, such as the ability to mark and label points in the recording, make it easy for narrators working on large works to preserve notes about pronunciation and characterization, allowing quick reference to information from past recording sessions. The phrase detection capabilities streamline the process of sifting through cumbersome audio files. Instead of using time as the criterion for navigation, these features allow the narrator to use content for maneuvering through the audio file in a manner similar to that of moving through text in a word processing program.

Studio Recorder also provides advanced capabilities such as punch in/out recording, linear fade, instantaneous editing, and time-specific alarm tones that assist the user in sizing a document to a cassette tape. Programming staff brought the proposal of releasing this project as a product to the Product Advisory and Review Committee (PARC),

and it was approved. Programmers then began work on the general market aspects of the program.

Work Completed in FY 2003: One of the most significant enhancements to *Studio Recorder* is in the area of marks. The studio staff uses audio marks to indicate kinds of content that *Book Wizard* later uses to convert to DAISY markup that represents a book's structure. Activity in the software includes the following enhancements:

- Adds a wave view scroll bar.
- Adds visual Mark Indicators to the wave view. While using the wave view, *Studio Recorder* indicates the presents of a mark in two ways. First, it draws a dashed vertical line in the wave view at the location of the mark. (You may change the color of this line in the Colors tab of the settings dialog.) Secondly, *Studio Recorder* places an indicator representing the mark in the mark bar.
- Adds the Mark Bar - The mark bar runs horizontally along the top of the wave view and displays indicators for all of the mark types used by *Studio Recorder*. The mark bar also allows basic manipulation of marks.
- Adds Move Mark by Dragging feature - To move a mark, simply left-click on its indicator in the mark bar and drag it to the new location.
- Adds Mark Context Menu - You may also perform operations on a mark by right-clicking its indicator and selecting from the shortcut menu that appears.

The mark bar shortcut menu contains the following commands:

- Name -- names or renames the specified mark.
- Tighten -- moves the specified mark to the beginning of the nearest phrase.
- Clear -- clears the selected mark.

Because two marks of different types can share the same location, or many marks can be placed close together, the mark bar uses a simple rule of precedents to determine the actual indicator, which is displayed. Custom mark one has the highest precedents, followed by the rest of the custom mark types (two through ten). Finally, the generic mark has the lowest precedents.

- Replaces the Clear All Marks command in the Special menu with a submenu with the same name. This submenu contains the choices Generic, Custom, and All. This makes it possible to clear all custom marks, all generic marks, or all marks.

The number of marks displayed in the status bar is now the total number of all marks in the document, instead of just the total number of generic marks.

- Adds the Tighten Mark and Tighten All Marks commands to the Special menu.

These commands move marks up to the beginning of the phrase.

The Tighten All Marks command searches through either the entire document or the current selection for any type of mark. When a mark is found, the program checks to see how close the mark is to the start of the next phrase. If there is room between the mark and the next phrase, the mark is moved up to the start of the phrase. Conversely, if the mark is found to be just inside the start of a phrase, the mark is moved back to the beginning of the phrase. While this command can be very helpful, it is important to be sure it is doing what you intend. For this command to work properly, the phrase parameters should be set appropriately for the current document. You may want to issue the Calibrate Phrase Parameters command before attempting to tighten marks, or be sure that the default noise threshold is set properly for the kind of recordings you normally produce.

Names for custom marks are now displayed in the status bar when the program is stopped and positioned on a custom mark. If the mark does not have a name, a default name like Custom One will be used. Since different mark types can reside at the same position in the document, there is an order of precedence associated with this feature. Custom mark type one has the highest precedence, followed by types two through ten. The generic mark has the lowest precedence. Note that this is the same precedence scheme used by the mark bar.

Changes were made to the keys used to access the Bins feature. Previously, the keys 1-0 inserted the bin tone into the recording. These functions are now accessed with alt+1-alt+0.

- Adds ten different custom marks.

Now, the keys 1-0 insert a custom mark that may be used for a variety of purposes. *Book Wizard* Producer can treat these custom marks as levels for Digital Talking Book level headings. The keys ctrl+1-ctrl+0 move to the next mark of the specified type and shift+ctrl+1-shift+ctrl+0 move back to the previous mark of that type. To clear a mark use shift+1-shift+0.

- Adds a Calibrate Phrase Detection parameters function. This command calibrates phrase detection parameters by looking at 10 minutes of audio from the current position or the selection and assigns base times based on the pauses in that section of audio. The function requires at least five minutes to perform accurate calibrations.
- Adds a command to revert to the default phrase detection parameters.

- Adds an audible clipped peak indicator. This indicator makes *Studio Recorder* emit two short beeps when the incoming signal clips. This provides an audio indication that the levels are set too high for the incoming signal. If you do not want this audio feedback, you may turn this behavior off in the Advanced page of the Settings dialog.
- Adds the space character as an additional time delimiter character in areas of the program that accept time input. This means that now, in addition to using 5:20, for instance, to move to five minutes, 20 seconds, you may now use 5 20 and 5:20.
- Adds MP3 encoding and decoding support. See the manual for details.
- Expands the peak meter. Previously, there were 13 segments in the meter, and now there are 19. This gives you more detail in the critical range (-20 dB to 0 dB).
- Makes the caret stay in the middle of the screen when scrolling the wave during playback.

Work Planned for FY 2004: This project is complete. See the write-up for the digital audio component for future possible enhancements.

Talking Learn Keys (Completed)

Purpose: To provide a Windows-based basic keyboard exploration program for visually impaired or blind users so they may become familiar with any computer keyboard or to hear keystrokes announced in applications.

Project Staff: Larry Skutchan, Project Leader
John Hedges, Programmer
Rob Meredith, Project Assistant

Background: *Talking Learn Keys* provides clearly recorded audio feedback about keys that users of any age type on the PC keyboard. It can be used in two configurations. In the first, the user can type any key on the keyboard without fear of doing something wrong because *Talking Learn Keys* processes the keys before they are presented to the system. In the second, the learner can use *Talking Learn Keys* to announce keys for any program on the computer. This can be useful for providing high quality feedback for number entry in data processing applications or simply to verify the user is typing properly in any application. The program uses prerecorded speech from professional narrators and allows the user to choose either a male or female voice. There are also options for fast or normal speed announcement of key presses and a pronunciation mode feature that allows

various pronunciations of some of the special keys. A large Verdana font type is used to display the key name. This feature is adjustable from the menu.

The idea for *Talking Learn Keys* was discussed and presented to the Product Review Committee, who approved development of the program. The Technology Group in the Department of Educational Research developed initial design specifications and a functionality features list. The programmers wrote, tested, and finalized the code in 1999, and *Talking Learn Keys* became available.

As the group continued the development of the *APH Speech Environment* with its new abilities to manage user registration, it decided to update *Talking Learn Keys* to take advantage of this capability. This also allows the program to be placed on the Web in a demo version.

Work During FY 2003: The program was modernized for new versions of Windows, including Windows XP. In a second area, new keyboards also may have additional multimedia buttons. These are controlled by vendor customized software. Support was added to handle the Microsoft multimedia keyboard. In addition, the other APH products now use the audio from *Talking Learn Keys*. It was helpful to create multiple audio components that allow other programs to use the audio files when installed on the same computer. The setup program has also been updated to use the Inno Setup for integration with current software distribution tools.

Work Planned for FY 2004: This project is complete.

Talking Word Puzzles (Continuing)

Purpose: To produce an accessible educational game on CD that uses hidden word or crossword-type puzzles

Project Staff: Larry Skutchan, Project Leader
Mario Eiland, Programmer
Rodger Smith, Programmer

Background: The need for an educational type of game like hidden word and crossword puzzles has been long expressed by customers and experts in the field. APH's Product Advisory and Review Committee (PARC) supported the idea for such a project in May 1998, and the programming group began work on the program in FY 2000. Project staff wrote program specifications for the program. Features planned include an intuitive text-to-speech and large print navigation system through the puzzle grid. The interface includes appropriate, responsive speech and highlighting feedback as the student uses the shift key along with the arrow keys to mark a word in the grid and distinguishable characteristics as the student moves across words already marked. Specifications also call for a creation process that allows the teacher to enter either a list of words or a list of

words and clues to those words in the case of a crossword puzzle. This data gets committed to persistent storage and all puzzles get dynamically generated from this information.

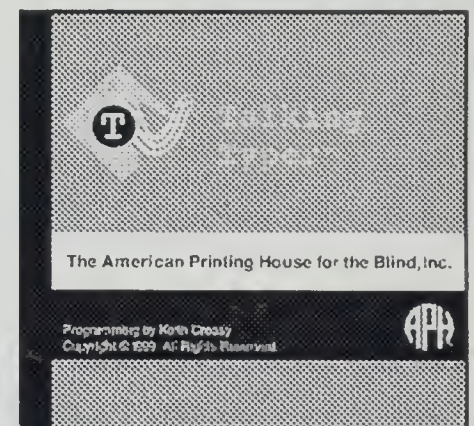
Work During FY 2003: Routines to display the grid of words were completed. The generation of a new puzzle occurs every time the user adds a new word. Functions to move through the grid with speech feedback were completed, and the functions to mark the word in the grid and move it to the completed list were written, tested, and completed.

Work Planned for FY 2004: The programmers will complete the coding of the product specifications, and research staff will run internal testing before submitting the product to the field test process. Staff will write documentation and design the field test questionnaire. The programmers will correct any problems discovered in field testing, add any reasonable requests, and submit the modifications for further testing.

Talking Typer for Windows (Completed)

Purpose: To provide accessible, interactive keyboard training on the Windows platform.

Project Staff: Larry Skutchan, Project Leader
Keith Creasy, Programmer
John Hedges, Project Assistant
Rodger Smith, Project Assistant
Kris Scott, Project Assistant



Background: *Talking Typer for Windows* is a program based on two former APH products, the *Talking Typer for Apple II* and *PC Typer*. Like its predecessors, *Talking Typer for Windows* includes features that allow users to create and modify drills and dictation exercises. It also includes features for recording and storing, and examining student records and performance statistics. The program also contains a fun game with scorekeeping capabilities. After completing program specifications, the basic framework of the project was created. Program specifications included the features from the DOS-based PC Typer plus additional features identified by users of the previous version. Enhancements to the previous version are:

- (a) the program is self-voicing, so no screen access program or speech synthesizer is required,
- (b) new students automatically receive a default list of lessons,
- (c) support for special computer keys is included,
- (d) the program includes the ability to record and playback dictations,

- (e) software is completely network ready, and
- (f) teacher management and lesson activities are combined into one program with password restricted access to teacher privileged functions like record manipulation and default settings. The program entered its field testing phase in September 1999.

The programming group field tested *Talking Typer* over a six-month period in a variety of sites, and the field test participants played a very active role in shaping the development of this product. Field testing began in September 1999 with an early prototype of the system and the programmers quickly replaced features that were difficult to understand with methods suggested by participants. The field testers and customers suggested adding some lessons that used common phrases, so Research Assistant, Kris Scott created two new lessons with about 40 phrases in each lesson. Customer feedback indicates these were a great idea and several users requested the two-phrase lessons be renamed Sentences and to create additional lessons that come before the sentence lessons that contain shorter, more common phrases.

Kristopher Scott, also corrected some errors in the original lessons that testers identified. Staff then updated the Wizard to distribute these as part of the standard lessons that come with *Talking Typer*. Staff continually refines and improves the program, and each of the new versions is tested and distributed with the new production run. *Talking Typer for Windows* has been a tremendously successful program, selling well over 1000 copies per year.

Work During FY 2003: Staff obtained a license to begin distributing AT&T's Natural Voices text-to-speech engine with the product.

Version 1.0.7, March 2003 – Programmer John Hedges corrected issues with setup that caused DARPAN, APH Digital Audio Recording, Playback and Navigation component, not to be installed during normal program setup and installation.

Version 1.8, June 2003 - Programmer Keith Creasy added functionality to automatically check for updates to the software and allow the user to have the latest version downloaded and installed. A bug was also fixed that caused Talking Typer to lock up on at least one computer.

Version 1.8.1, June 2003 - Hedges updated the setup of *Talking Typer* to use a common documents folder and provided registry settings that specified the new location.

Version 1.8.2, June 2003 - Creasy added support for the slower version of the digitized spelling and fixed a bug that caused the help window to be opened twice. He also changed the location of the lesson files, user preferences, and other data that gets stored during program execution. This corrects issues involving normal users attempting to write lesson files on a machine with restricted access.

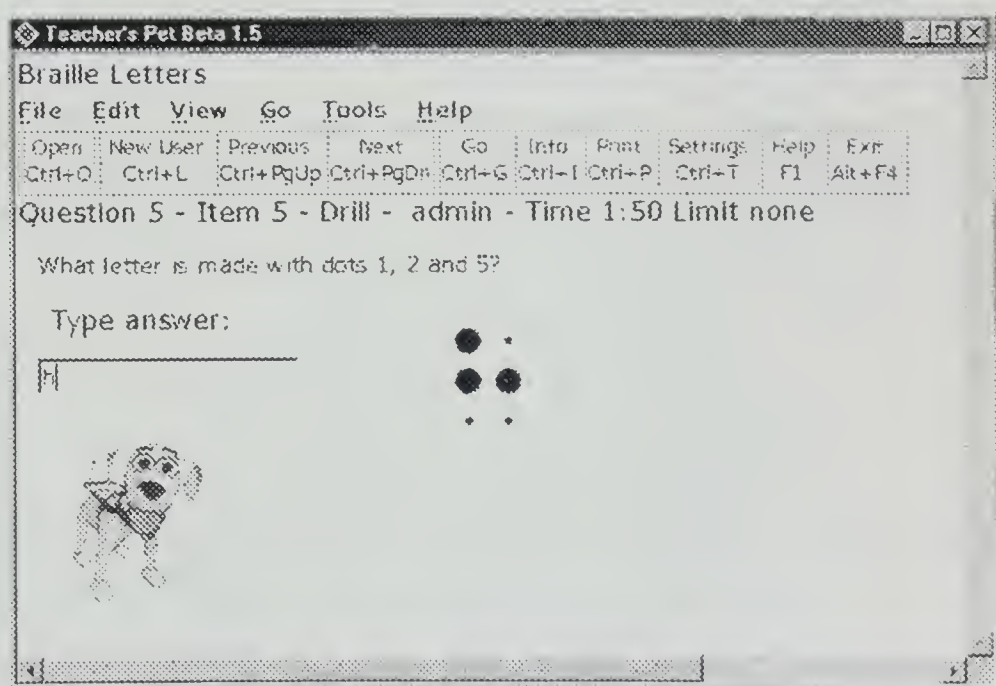
Work Planned for FY 2004: New features may be added to *Talking Typer for Windows V.1*, however most will be deferred to *Talking Typer for Windows V.2*. Necessary corrections and updates will be made as needed. *Talking Typer version 1.0* is complete. Maintenance issues continue to arise with this product, and users continually request enhancements. Perhaps the number one complaint with the program was the quality of the synthesized speech. Staff addressed this issue by obtaining a license to distribute AT&T's Natural Voices text-to-speech engine with the product and the next run of the product includes this engine.

Teacher's Pet (Continuing)

Purpose: To develop a program used to create and take tests and practice drills and to provide student progress record keeping.

Project Staff: Larry Skutchan, Project Leader
John Hedges, Programmer
Tessa Wright, Project Assistant
Rosanne Hoffmann, Project Assistant

Background: APH has long been interested in providing an accessible means of creating and delivering test content to blind and visually impaired students. An early attempt at this goal, *Teacher's Pet for the Apple II*, was a huge success. Members of Educational Research continue to receive requests for a Windows-based program that would perform similar functions. The group designed a new program to deliver content and record progress using Extensible Markup Language (XML) as its native file format. The design specifications call for software that is self voicing with easily adjustable display characteristics and a simple user interface that provides mechanisms to repeat or more closely examine test material. The program must



also store and retrieve student statistics and access settings and provide an interface to make the teacher's job of preparing the test simple through modern drag and drop capabilities for multi-media objects like graphics and sounds. *Teacher's Pet* must also manage and display student records.

Staff wrote program specifications that include the support for a variety of question types including open-ended, fill-in-the-blank, true/false, and multiple choice. Programmer John Hedges created a prototype of the application in March 2000 using JavaScript as the programming language. (This was APH's first venture into this language in its attempt to identify a language that provides rapid deployment possibilities yet supports accessible design concepts.) He created techniques for providing user interface elements supporting universal design concepts and incorporated the APH digital audio component and APH Speech Environment to provide some of the core services the software required.

The programming team successfully solved a number of access and design issues. The program received such capabilities as an automatic integrated sound recording and playback facility that includes the ability to limit the time of the recording (through the APH Digital Audio Control), Cascading Style Sheet (CSS) support for flexible display adjustment, selection and display routines, a dialog to open and identify *Teacher's Pet* test files, evaluation functions that are extensible enough to permit a variety of formats for acceptable answers, and functions to preserve and restore user preferences and access settings. The programmers added the user interface and input mechanism that lets the student enter the answer in whatever format the teacher or parent specifies and the dialog and input routines that lets the teacher or parent create the test material. Functions were written to present the question, to navigate from question to question, and to move through long questions as is the case when there are several paragraphs or pages of text to read.

Work During FY 2003: The programmer revised the program to incorporate field tester feedback and new features to enhance document creation and sharing. Program stability was also improved and processing flexibility expanded. The following features and changes were made:

- The document structure was changed to more closely use the NISO z39.86 Text Document layout and a package file is now included that lists all files associated with a test or drill.
- A distribution information file is now supported as an advanced option to share documents from a distribution media or Website. This feature is integrated into the revised document open command where specified folders are available to retrieve documents.
- The create and edit screens were changed to default to a question pool list and added more on screen buttons to supplement menu commands.
- Added more edit features, including insert, add, copy, cut, and paste, undo edit

form, and image sizing screen. The clone document option was added to copy and edit an existing document.

- The screen review processing was updated to generalize some features and standardize html layout on each screen for optimal text reading that associates label and control content.
- The admin user no longer has a document view in normal sequence, but can only preview a question one at a time. This helps simplify the create and edit process. Any other user no longer has access to the edit or student data records screens.
- The menus were rearranged to add new features such as the advanced screen and the Options dialog, which now has a reset defaults button.
- The document now supports info type questions that display non-question content. These appear in normal sequence documents and can act as an informational document when no questions are present.
- The open dialog was changed to simplify document access and a delete command and dialog added. The Advance screen lets the admin add and delete folder locations for document lists or Website URLs.
- The introduction screen is now able to contain audio and images, to be edited and displayed like a question.
- Files are now stored in accordance with security guidelines for Windows 2000 and later. Documents and shared data are stored in a folder in shared documents. Individual settings are stored in the users personal folder. The shared files have permission set for use by multiple users.
- The user name now defaults to the system name, which is usually the network login name. The default user name, along with admin and default user names are automatically available. Additional user names and any passwords must be set by the admin user. The user name can be changed at any time. Login prompting is now only needed to confirm a password.
- Printing of student data records is now supported.
- The setup now supports separate distribution of sample documents and the program. This allows easier beta and demo downloading. The setup supports Internet Explorer version detection and installation of Internet Explorer 5.5, which is required for some program features.
- The audio edit screen now displays a script text window to prompt the user when audio is exact text property is selected.
- When audio or images are created or added, their names are set to lower case for compatibility with Website distribution. The document folder is also set to lower case.

- When creating a new document, the name presented is now unique by number, such as Untitled 3.
- The program now supports a combined common set of scripts, including shell folder processing that imitates new shared documents and application data.
- The program can now automatically update from the APH Website. The default is to check for program updates at start up.

Work Planned for FY 2004: *Teacher's Pet* will continue to be refined as long as field testers identify issues with the access, style, documentation, content, and stability, a field test questionnaire will be composed. Once the field test results are evaluated, and modifications have been made and tested, the product will be made available. The product CD will be duplicated, large print and braille versions of the installation guide will be produced, and the product will become available.

Word Player (Continuing)

Purpose: To produce an MP3 player software package geared to spoken word audio content.

Project Staff: Larry Skutchan, Project Leader
Rob Meredith, Programmer
Monica Coffey, Project Assistant

Background: One of the technology focus sessions at the APH 2001 annual meeting asked for input about the need for an MP3 player program geared toward spoken word audio content. The participants overwhelmingly voted that there was such a need, and programmers began coding the project.

Work Completed in FY 2003: Other demands put this project on hold for the time.

Work Planned for FY 2004: Coding will be completed, and the manual, graphics, and testing will be finalized. The program will go to field testing, and revisions will be made as dictated by field testers. Then it will be finalized and turned over to production for duplication, packaging, and sales.

Verbal View of Windows XP (New)

Purpose: To produce a tutorial that shows blind and visually impaired users how to make the most effective use of Windows XP from a keyboard user's perspective.

Project Staff: Larry Skutchan, Project Leader
Peter Durant, Project Consultant
Keith Creasy, Programmer
Sara Zizzo, Studio Monitor
Robert Conaghan, Studio Monitor

Background: Trustees have requested the production of high quality tutorials for many years, and staff has searched for an existing product that teaches the use of Microsoft Windows. When they found *Verbal View of Windows XP*, they knew they had found an excellent quality tutorial. APH purchased the rights to the tutorial and will provide it in several formats including Word file, html, text, mp3, and DAISY NISO. The tutorial CD will ship with a version of *Book Wizard* that plays only this book.

Work Completed in FY 2003: Staff worked with the author to emphasize some concepts and re-arrange the presentation. The studio recorded and marked the sections of the book. Staff imported the audio and html into *Book Wizard* and created a Digital Talking Book Master.

Work for FY 2004: Staff needs to create a version of *Book Wizard* that loads the book more quickly. The manual that tells how to use the tutorial will be finalized, and the tutorial will become available.

Multiple Disabilities

Tristan Pierce

Braille Rap Song (Continued)

Purpose: To have a fun and provide an alternative way of teaching braille recognition, particularly to students who are blind and have additional disabilities.

Project Staff: Tristan Pierce, Project Leader
Lynn Horton, Lyrist/Consultant
Tammy Whitten, Composer
Keith Creasy, Music Advisor
Bernadette Mudd, Music Advisor
Malcolm Turner, Music Advisor

Background: In July 2000, Lynn Horton, a teacher at the Helen Keller School for the Blind, located in Talladega, Alabama, came to APH and presented an array of products that she had developed for teaching her students who are visually impaired and have multiple disabilities. At that time interest was expressed in her song that teaches braille. At the 2001 Council for Exceptional Children (CEC) Conference she again presented many of her products, including the *Braille Rap Song*. Several members of the APH staff attended the presentation. Cassettes or CDs will be distributed at conferences at no charge and the MP3 file can be downloaded from the APH web site. University students studying to become vision teachers have expressed interest in the song to help them learn braille.

Work During FY 2003: The preferred performers continued to try and find time to fit this project into their touring schedule but were unable to do so. It was determined to go in house with the development of the product.

Work Planned for FY 2004: A trio of APH staff has agreed to act as musical advisors and one will arrange the melody as needed. Performers will be considered from APH, Kentucky School for the Blind, and local talent.

Cortical Visual Impairment (CVI) Projects and Needs (Continuing)

Purpose: To help APH determine both short and long term goals for future research and product development in the *CVI* field. Current project is development of a *CVI* web site.

Project Staff: Tristan Pierce, Project Leader/Contributing Writer
Elaine Kitchel, Low Vision Advisor

Tessa Wright, Research Assistant/Contributing Writer
Christine Roman, CVI Consultant

Background: The Multiple Disabilities Focus group identified the need for APH to provide a compilation of materials related to *CVI*. It ranked as the third greatest in the field on the Multiple Disabilities Survey. APH hosted *CVI Synergy* in May 2002. The group of nine professionals, representing both education and medicine, agreed that a clear, understandable, education-based definition of *CVI* needed to be established. It was decided that APH should develop a web site dedicated to *CVI*.

Work During FY 2003: The Educational Research Department held a planning meeting with Christine Roman to outline and categorize possible *CVI* products for development. Ideas were developed from the list of ideas presented by *CVI Synergy* in May, 2002. Several new products are now under development.

Work Planned for FY 2004: APH staff will continue to develop new products for *CVI* and when appropriate incorporate good *CVI* practices into other APH products.

CVI Synergy Web Site (New)

Purpose: To provide accurate and beneficial information to families, educators, and medical personnel who work with individuals with cortical visual impairment.

Project Staff: Tristan Pierce, Project Leader/Contributing Writer
Tessa Wright, Research Assistant/Contributing Writer
Elaine Kitchel, Low Vision Advisor
Inge Formenti, Librarian
Malcolm Turner, Web Master
Pati Alexander, Consultant
Terri Connolly, Consultant
J.C. Greeley, Consultant
Maryke Groenveld, Consultant
Jim Jan, Consultant
Mary Beth Langley, Consultant
Bisig Impact Group, Illustrations

CVI Synergy West (May 16, 2003):

Roger Freeman, M.D., British Columbia's Children's Hospital, Vancouver, BC
Maryke Groenveld, Ph.D., British Columbia's Children's Hospital, Vancouver, BC
Jim Jan, M.D., British Columbia's Children's Hospital, Vancouver, BC
Linda Mamer, Ph.D., British Columbia's Children's Hospital, Vancouver, BC

Carey Matsuba, M.D., British Columbia's Children's Hospital, Vancouver, BC
Christine Roman, Ph.D., Marshall University, Huntington, WV

Background: *CVI Synergy*, a group of nine professionals, representing both education and medicine, met at APH in May 2002. The group agreed to act as advisors via a listserve to help APH develop a new web site dedicated to *CVI*. Unable to attend the meeting, Dr. Jim Jan served via telephone and e-mail as the medical advisor.

Work During FY 2003: The Multiple Disabilities Project Leader developed the outline for the web site and with the Research Assistant began writing text for the site and requesting submissions from the field. The APH Librarian obtained permissions on articles recommended by *CVI Synergy* to be placed on the web site. Photographs of children using homemade and APH products were taken.

In May, Dr. Jan organized *CVI Synergy West* in Vancouver, BC, Canada. This second group, also representing medicine and education, tackled the subject of the many misnomers used for *CVI* and defined a list of neurological visual impairments that are often used inaccurately to mean *CVI*. This meeting resulted in the medical-based definition and the education-based definition for *CVI* that APH uses on the web site.

Work Planned for FY 2004: To continue developing and expanding the web site to better serve families and vision professionals working within the field of *CVI*.

Lots of Dots: Learning My ABC's (Continuing)

Purpose: To facilitate braille character recognition through a series of repetitive activities designed for young children with visual impairments and multiple disabilities. This raised line coloring book is designed for future large print readers and braille readers. Most importantly, the purpose is to have fun!

Project Staff: Tristan Pierce, Multiple Disabilities Project Leader/Author
Judith Parks, Consultant
Brian Dougherty, Illustrator

Background: The development of a raised line coloring book was recommended by the Multiple Disabilities Focus Group and the need was confirmed by the Multiple Disabilities Survey. A former APH Early Childhood Project Leader recommended using the book as a way of teaching letter recognition.

Work During FY 2003: Field testing was completed and changes were made. The product is ready for production.

Work Planned for FY 2004: Make product available for sale.

Multiple Disabilities Projects and Needs (Continued)

Purpose: To assess needs, plan research, and manage product development to better serve individuals who are visually impaired and have additional disabilities.

Project Staff: Tristan Pierce, Project Leader

Background: A Multiple Disabilities Focus Group was created and the group met at APH in March 2001. The group identified a total of 48 product ideas and held detailed discussions on the revision of APH's *Sensory Stimulation Kit*, the development of a tactile (communication) symbol system, and the value of adaptable calendar boxes. The 48 product ideas were developed into a needs survey that was distributed nationally and received international participation. The results of the survey were presented at the 2002 Annual Meeting. Since that time, six of the eleven projects the Multiple Disabilities Project Leader has worked on are from the survey. One is from another survey conducted by an Ex Officio Trustee and the remaining four were either submitted from the field, through the APH Toy Team, or are APH products being updated.

Work During FY 2003: Development work continued on the *Sensory Learning Kit*, *Tactile Connections*, *Sound Ball*, and *Lot's of Dots*. The Project Leader began creating a web site dedicated to cortical visual impairment. Development work began on a smaller, sport edition of the *APH Portable Sound Locator* and on a new transition age product on physical fitness and leisure activities. An electronic survey was done to research the use and physical properties of calendar boxes.

Work Planned for FY 2004: Work will continue on the above mentioned products as well as reactivate the development of *Magnet Mate Math* and the *Braille Rap Song*. Adjustable/adaptable calendar boxes will be submitted for development and information gathering will continue on age-appropriate, high-interest, low vocabulary storybooks.

Sensory Learning Kit (Continuing)

Purpose: To redesign the existing *Sensory Stimulation Kit* to meet current APH and educational standards.

Project Staff: Tristan Pierce, Project Leader
Millie Smith, Consultant/Author
Judith van Naerssen, Consultant/Contributing Writer

Marie J. Amerson, Educational Reviewer
Paul J. Rychwalski, Medical Reviewer
Rosanne Hoffmann, Research Assistant
James Robinson, Electronics Specialist
Bisig Impact Group, Design, Layout, and Illustrations

Background: Upon reviewing the *Sensory Stimulation Kit*® the Project Leader recognized that the product needed to be redesigned and updated using current best practices and APH standards. The Project Leader presented the concept of a complete redesign to the Multiple Disabilities Focus Group in 2001. The group recommended the introduction of a sensory learning profile that could travel with the child as he/she moves through their educational years. They also recommended that an assessment be included with the kit and that including activities that could be child initiated would be valuable. The recommendations of the group were verified by the results of the Multiple Disabilities Needs Survey that was conducted May15-July 1, 2001. The new product was given the name of *Sensory Learning Kit* (SLK).

Work During FY 2003: An electronic survey was conducted on penlights/flashlights and the need of various colored lenses. The manuscripts for the *SLK Guidebook*, *SLK Assessment Book*, and *SLK Routines Book* were completed and read by an educational reviewer and a medical reviewer. The prototypes were developed and field testing began.

Work Planned for FY 2004: The field testing will be completed, the necessary changes will be made, and the product will be completed. Present new product at the 2004 Association for Education and Rehabilitation for the Blind and Visually Impaired (AER) Convention.

Physical Fitness Staff

Going Places: Transition Guidelines for Creating Community-Based Athletic Activities for Students Who are Blind or Visually Impaired (New)

Purpose: Guidebook outlining a variety of athletic activities that people with visual impairments might participate in, accompanied by school-based and functional programming ideas that will facilitate the development of competencies for successful participation. The accompanying video/DVD will highlight three case studies.

Project Staff: Tristan Pierce, Project Leader
Ann Travis, Research Assistant
Lauren Lieberman, Consultant/Co-author
Scott Modell, Consultant/Co-author
Paul Ponchillia, Consultant/Contributing Author
Ileah Jackson, Consultant/Contributing Author

Background: The Multiple Disabilities Focus Group identified the need for structured leisure skill activities that teach and promote physical health and functional life skills for students transitioning from high school to college or work. The Project Leader researched and collected many resources and activities that could be used. Research led to an article written by Scott Modell, Kinesiology Professor at California State University, who had developed a program for transition age students with multiple disabilities. Adapted physical education specialists (one is also trained and experienced in deaf-blindness) joined the team to create this exciting product.

Work During FY 2003: Consultants came to the American Printing House for the Blind and established the book's content outline and writing timeline. Writing assignments were made.

Work During FY 2004: Continue writing manuscript.

Portable Sound Source IV *Sport Edition* (New)

Purpose: To have a reliable sound source that is small enough and adaptable enough to use in physical and leisure activities (i.e., basketball, rock climbing, hiking, etc.). Accompanying book will provide sound locator activities (revision of current APH book for the *Portable Sound Source III*).

Project Staff: Tristan Pierce, Project Leader
Rosanne Hoffmann, Research Assistant
James Robinson, Electronics Specialist

Tom Poppe, Pattern and Model Maker
Frank Hayden, Technical Research
Bernadette Mudd, Graphic Designer

Background: The Project Leader noticed the need for a smaller and more adaptable electronic sound source while conducting focus group sessions on the Sound Ball. Upon reviewing the *Sound Localization Book* that currently accompanies the *APH Portable Sound Source III*, the need for revision was identified.

Work During FY 2003: Project Leader outlined the needs and design features wanted for the new sound source. Electronics were developed and size had to be adjusted to house electronics, speaker, and features. A product specific electronic survey was conducted to determine new needs for the Sound Localization Guidebook. The Graphic Designer located a sculpture in Chicago that features children playing. Upon receiving permission to use photographs of the sculpture, the cover design for the guidebook was completed.

Work During FY 2004: Complete prototypes so they can be issued to Orientation and Mobility and Physical Education Consultants for use while writing the guidebook.

Research: A Three-Year Parent-Child Physical Activity Intervention Among Families of Children with Visual Impairments

Purpose: The study will see if parents who expect their child can be successful in the psychomotor domain and who value success in that domain will be more likely to influence their child towards participation and persistence in this area.

Project Staff: Tristan Pierce, Project Leader
Lauren Lieberman, Consultant
Moira E. Stuart, Researcher

Background: Camp Abilities is a one-week developmental, residential sports camp for children who are blind, Deafblind, and may have multiple physical impairments. Camp Abilities was founded by and is directed by Dr. Lauren Lieberman, Associate Professor in the Department of Physical Education and Sport at SUNY College at Brockport. Dr. Lieberman submitted this three-year study to be conducted at Camp Abilities. She has gained an international reputation in the field of adapted education for youth that are visually impaired. Her experience combined with Dr. Moira Stuart's expertise in the field of sport psychology will provide the necessary expertise to successfully complete this study. Dr. Stuart runs an undergraduate and graduate program in Sport Psychology at Northern Illinois University.

Work During FY 2003: Prior to camp beginning, parents/caregivers completed the parent/caregiver subjective task value questionnaire, expectations for success questionnaire, and barriers to physical activity questionnaire. At the beginning of camp, participating campers completed their own subjective task value questionnaire, expectations for success questionnaire, and barriers to physical activity questionnaire.

Work During FY 2004: Parents and campers will participate in the activity assessment portion of the study. Researchers will present first year findings at a national vision conference.

Research: An Analysis of Gait Kinetics of Visually Impaired Children During Running

Purpose: This is an investigation of the forces that directly result in observed movement patterns during running. There are four goals:

- Comparisons between various running techniques
- Comparisons between levels of visually impairment with regards to the effects on kinetic and kinematic running patterns
- Collect comprehensive database of kinetic and kinematic patterns of VI runners
- Use the database to examine more complex biomechanical analysis of gait patterns for VI children.

Project Staff: Tristan Pierce, Project Leader
Lauren Lieberman, Consultant
Christopher Williams, Research Director
Marie DeLobbe, Research Assistant

Background: Camp Abilities is a one-week developmental, residential sports camp for children who are blind, Deafblind, and may have multiple physical impairments. Camp Abilities was founded by and is directed by Dr. Lauren Lieberman, Associate Professor in the Department of Physical Education and Sport at SUNY College at Brockport. Dr. Lieberman submitted this study to be conducted at Camp Abilities. She has gained an international reputation in the field of adapted education for youth that are visually impaired. Her experience combined with Dr. Christopher William's expertise in the field of kinesiology and biomechanics will provide the necessary expertise to successfully complete this study. Dr. Williams is the director of the Biomechanics Lab at SUNY Brockport.

Work During FY 2003: Campers were classified by visual impairment (B1 & B2). In addition, each camper was asked to run under the following conditions: independently, with a sighted guide, with a guide wire, and with a caller (or sound mechanism). All children were allowed to run at a self-selected pace.

Video data was recorded using a Peak 5 Motion Analysis system. Markers were placed bilaterally at the ankle, knee, hip, shoulder, and head. Video data was captured in the sagittal (side-view) and frontal (front-view) planes, and recorded linear and angular displacement, velocity, and acceleration of the body and its segments. During running under each condition, participants made foot contact with a Kistler force platform, which was located on a running stage (platform) built for the participants. The force platform data yielded ground reaction forces, from which kinetic measures were derived. Comparisons of kinematic and kinetic measures based on level of VI and running condition are being made using a 3 X 4 MANOVA design.

Work During FY 2004: Publish research results.

Sound Ball (New)

Purpose: To create a reliable ball with an electronic sound that can be used to play games as well as be used with very young children indoors as a sound source to encourage crawling and reaching.

Project Staff: Tristan Pierce, Project Leader
James Robinson, Electronics Specialist
Tom Poppe, Model Maker
Frank Hayden, Technical Manager
Jeff Halter, Consultant
Bill Bartasevich, Consultant

Background: The need for an electronic sound ball was established through a survey conducted by Don Potenski, Ex Officio Trustee from New Jersey. Having a strong interest in physical fitness, the Multiple Disabilities Project Leader requested to research the feasibility of creating this product. Multiple focus group sessions were conducted with students and adults to address their needs and features they desired in a ball.

Work During FY 2003: The research resulted in designing an eight inch ball with dual speakers and dual volume control (near volume and distant volume). Numerous sounds were tested with children to identify two sounds that were easily located both indoors and outdoors, and did not replicate any sound in their natural, home, or school environments. Drawings were developed and 12 prototypes were created. Problems with the first-round prototypes have been evaluated and adaptations are being developed.

Work During FY 2004: Continue working out design problems and create another round of prototypes for field testing.

Science

Staff

Sense of Science: Animals (Continuing)

Purpose: To develop a set of materials for blind and low vision students in grades K-3 that promotes active, hands-on learning activities that emphasize basic concepts related to animal life. This is the second module of a planned series.

Project Staff: Karen Poppe, Project Leader/Co-Author
Emily Bowers, Project Co-Author
Tom Poppe, Pattern and Model Maker
Bernadette Mudd, Cover/Packaging Artist

Background: *Sense of Science: Animals* is the second module of a planned series intended to make the world of science accessible to young students with visual impairments. This new set of science materials will resemble in both content and design the introductory module, *Sense of Science: Plants*, incorporating both fun-filled, hands-on activities and the tactile/visual overlays for use with APH light boxes.

The tactile/print overlays planned for the Animals kit were sketched and designed by the Project Leader and the Pattern and Model Maker. The best tactile representation of each overlay and ideal silkscreen colors for the visual overlays were determined. Concurrent with the development of the overlays, the Project Leader worked with project authors to develop hands-on activities for the guidebook categorized by animal habitat (e.g., desert, wetlands, rainforest, ocean, etc.). The main components of each activity include the following: the stated objective of the activity, the vocabulary introduced, list of needed materials, a step-by-step procedure, an extension for older students, a math connection, a language connection, suggestions for visual adaptations, and a science tidbit/interesting fact. Extensive lists of suggested children's literature were also compiled for each animal unit.

Prototypes were sent to ten field test sites in FY 2001. Eight teachers from the states of Pennsylvania, Michigan, Georgia, Virginia, Missouri, Tennessee, and New Mexico completed the evaluation, having used the materials with a combined total of 47 visually impaired and blind students. The teachers expressed satisfaction with the scope and appropriateness of the guidebook activities and the tactile/print overlays. As one teacher noted, "Seeing the tactual making sense to my students was the greatest strength." A final report of the field test results was prepared and reviewed by an in-house research committee; appropriate revisions were determined based upon the teachers' feedback.

During FY 2002 efforts were focused on revising and updating the hands-on activities included in the guidebook based upon field test feedback. Modifications and enhancements were made to the tactile/print overlays as well. Overlays prepared for silk-screening and thermoform production included the following:

- Ant
- Bird (Side View)
- Bird (Top View)
- Butterfly
- Fish
- Mouse
- Spider
- Snake
- Turtle
- Life Cycle of a Butterfly
- Life Cycle of a Frog
- Spider Web Construction
- Animal Tracks

The most significant revision implemented during post-field testing stage was the inclusion of an exploded overlay that allows the totally blind student to identify various parts of animal apart from the whole tactile representation and serves as an assessment tool. The Project Leader worked continuously with an contracted illustrator, the in-house graphic designer, an outside Graphic Designer, the Pattern and Model Maker, a manufacturing specialist, and research assistants to prepare the final documentation, product specifications, and production tooling needed for the initial production runs.

Work Completed During FY 2003: Production of the product was delayed a year due to complications experienced by the outside graphic designer during the preparation of the silkscreen artwork. Given continued complications and doubt that working masters would ever be correctly created by the outside designer, the tooling of the silkscreen masters shifted to the Pattern/Model Maker who was successful at preparing actual screen art for in-house production purposes. The Project Leader and Pattern/Model Maker spent a great deal of effort preparing this final artwork under a tight deadline.

The Project Leader worked with the in-house Graphic Designer as the layout of the guidebook was completed, providing editing tasks, art direction, and final approval. Artwork was prepared for the outer guidebook cover and related dividers. A braille translation of the guidebook was completed in January 2003. Technical Research staff prepared the screen artwork for the overlay housing folder.

Work Planned for FY 2004: The pilot run and production run are slated for the second quarter of FY 2004. The Project Leader will be actively involved in checking the quality of in-house produced materials and vendor supplied items, as well as monitoring the first production runs. Related marketing activities will follow completion and availability of the product. The product will be showcased at upcoming conferences and workshops.

Sense of Science: Astronomy (New)

Purpose: To develop a set of materials for blind and low vision students in grades K-3 that promotes hands-on learning activities that emphasize basic concepts related to astronomy. This is the third module of a planned series.

Project Staff: Karen Poppe, Project Leader/Co-Author
Tessa Wright, Project Assistant
Tom Poppe, Pattern and Model Maker

Background: *Sense of Science: Astronomy* is the third module of a planned series intended to make the world of science accessible to young students with visual impairments. This new set of science materials will resemble in both content and design the introductory life science modules, *Sense of Science: Plants* and *Sense of Science: Animals*, by incorporating both fun-filled, hands-on activities and the tactile/visual overlays for use with APH light boxes.

Initial development activities included investigating and purchasing existing, commercially-available educational materials related to astronomy. Concurrently, lists of helpful, student-targeted web sites and children's literature related to planets, galaxies, and space exploration, etc., were compiled by the project staff.

In September 2002 the product idea was presented to the Product Evaluation Team (PET) and the Product Advisory and Review Committee (PARC) and received approval from both.

Work During FY 2003: Extensive product development was curtailed due to the Project Leader's involvement on other products of higher priority. However, some work was initiated on the actual writing of content material, and more thought was given to possible overlay depictions (e.g., types of galaxies).

The Project Leader also presented the product idea to a recent science focus group assembled at APH. Some of the members expressed interest in assisting in the review and writing of the activities. Ralph Bartley, Director of Research, also gave the Project Leader additional consultant possibilities.

Work Planned for FY 2004: The Project Leader will contact possible outside consultants to assist in the writing and/or review of original astronomy activities and begin sketching possible overlay designs (both tactile/print) that will be tailored for use with APH light boxes. Additional hands-on materials beyond the planned overlays will be considered for inclusion in the kit.

The Project Leader will conduct a PARC meeting to set a product timeline and to determine a reasonable goal for complete prototype development.

Tactile Periodic Table of Elements (Continuing)

Purpose: To develop a tactile *Periodic Table of Elements* appropriate for blind

and visually impaired students in elementary school, middle school, high school, and college

Project Staff: Karen J. Poppe, Project Leader
Tom Poppe, Pattern and Model Maker

Background: The Project Leader presented the product idea to APH's Product Advisory and Review Committee (PARC), giving specific examples of requests from the field. The committee supported the development of the product that has been described as two accessible renditions of the *Periodic Table of Elements* - one that will serve as a tactile reference sheet and a second that will be interactive in design, allowing students to sequence and group the elements. Braille and large print study cards containing basic information about each element are also planned.

The project staff also met with a science teacher of the visually impaired to review a handmade, magnetic, interactive model of the Periodic Table that proved very successful and motivating for his students. This model was reviewed with the Tactile Graphics Brainstorming Committee in August 2002; they too were excited about the teacher's innovative approach to presenting this science concept.

Work During FY 2003: The project remained in the PARCing Lot for the majority of this year, but as time allowed, the project staff continued to research, purchase, and review other commercially available Periodic Tables.

Work Planned for FY 2004: Given continued requests for a tactile *Periodic Table of Elements*, and as evidenced in the results of recent product surveys and focus meetings, the project staff will begin active development on this project in FY 2004.

Tactile Graphics

Karen Poppe
&
Fred Otto

Activity Game Book (New)

Purpose: To develop the first of a planned series of activity game books that will feature an assortment of activities for developing young children's tactile skills within a fun, recreational context.

Project Staff: Karen Poppe, Co-Project Leader
Fred Otto, Co-Project Leader
Lane Koniak, Consultant

Background: The idea of a magazine style series to provide children with visual impairments and blindness with a steady supply of fun tactile activities has been discussed and planned by the Project Leaders for some time. Over recent years, fun activities to encourage the development of necessary tactile skills (e.g., scanning, discriminating, locating reference points within a graphic, contrasting and comparing tactile elements, etc.) have been designed, explored, and sometimes incorporated into existing products such as *Teaching Touch*. Best ways to construct tactile mazes, seek-n-find activities, word games, dot-to-dot puzzles, coloring activities, word hunt puzzles, etc., in a manner that children with visual impairments can enjoy and complete independently, have been of primary consideration for the Project Leaders.

The recent submission of a tactile activities booklet, which was hand-tooled and prepared by a retired teacher of the visually impaired, reinforced the need and potential for such a product. The Project Leaders will use the submitted tactile activities as a springboard for a broader endeavor, that is, a biannually-produced magazine for young children.

Work During FY 2003: The Project Leaders initiated work on the project by creating original tactile puzzles and brain teasers that will serve as possible regular features for the planned series. The Project Leaders also met with the project consultant in late August to select appropriate activities from her game inventory that will complement the expected style and presentation of the product. Outside publishers of mainstream children's activity booklets were contacted for material that, with permission, could be modified and produced in a tactile fashion.

Work Planned for FY 2004: An extensive sampling of possible tactile activities will be created and readied for field test purposes. Based upon direct feedback from young readers and their teachers and parents, the most popular games and activities will be selected as regular features for both the initial and future editions of the product. (Note: All back issues of this tactile magazine will continue to be made available from APH as separate products for future generations to enjoy.) Contributing writers/game creators will eventually include other sources such as parents, teachers, and young readers themselves. The Project Leaders will explore the possibility of creating a web page, or

Kids Corner, for young readers of the magazine where they can access additional activities, share riddles or jokes of their own, and so forth.

Braille Transcriber's Kit: US Maps (New)

Purpose: To produce a set of basic embossed outlines for transcribers and teachers to use as a starting point in making tactile maps for their students. Transcribers will add labels, symbols, and other information as needed to make complete tactile graphics. The kit will contain assorted maps of the US, North America, regions, and maps often found in geography or history textbooks.

Project Staff: Fred Otto, Project Leader
Tom Poppe, Project Assistant
Tessa Wright, Project Assistant

Background: Demand from transcribers prompted creation of the first *Braille Transcriber's Kit: Math Edition* in 1997, and it was well-received. Responses to a questionnaire included in the kit indicate there is interest in similar sets of tactile clip art with outline maps. The materials could also be used by Accessible Textbook Initiative Collaboration (ATIC) transcribing agencies to promote consistency between transcriptions.

Work done during FY 2003: Upon receiving approval from the Product Advisory and Review Committee (PARC) for the project, the Project Leader worked with graphics staff in the Braille Department to design and tool sample plates for pressing the images. A PARC meeting was held to introduce the materials to production staff and establish a timeline.

Prototypes were shown to several experienced transcribers at the California Transcribers and Educators of the Visually Handicapped (CTEVH) Conference in March and changes were made based on their recommendations. A full field evaluation was done involving transcribers in Minnesota, Nevada, California, and three sites in Texas. Further revisions were made based on evaluators' suggestions and the product design and accompanying text were made final. Approval for sale under quota was given in May.

Work Planned for FY 2004: The product is expected to be made available for sale early in the fiscal year. The Project Leader and Technical Research staff will monitor initial production to ensure quality, especially as machine operators work with dampened paper on the presses.

Braille Transcriber's Kit: Math (Product Revision)

Purpose: To incorporate design and production improvements in the *Braille Transcriber's Kit: Math*, by adding new items and omitting others, while keeping the product affordable.

Project Staff: Fred Otto, Project Leader

Background: This consumable kit, available for several years as an aid to transcribers in making math-related tactile diagrams, has received positive responses along with requests for additional items and small changes in the design of current items. Additionally, the Project Leader wished to include a new description of the uses of low-relief graph sheets based on APH research studies. The overall changes to the kit necessitated treating the revision as a new project.

Work done during FY 2003: The project received Product Advisory and Review Committee (PARC) approval, and the Project Leader worked with Braille Department staff to design new components and modify existing ones. Proof samples were made and experimented with to make sure they fit the requirements as specified by transcriber comments. Since the product is an established one, and all changes were dictated by customer responses, a formal field evaluation was deemed unnecessary.

The Project Leader met with Technical Research and Production staff to determine which changes would be treated as new products and which could be handled through the Engineering Change Request (ECR) process. The group also discussed how to treat the current stock of items in the kit. One element, the .4" embossed graph paper, was spun off as a separately available new product.

Work Planned for FY 2004: The revised kit is expected to be produced and sold early in the new fiscal year. The Project Leader will notify a number of transcribers to alert them to the changes in the kit and ask them to keep in touch with feedback and suggestions.

Feel 'n Peel Stickers II (New)

Purpose: To provide an extended toolbox of various tactile, adhesive stickers that can be used by teachers, family members, and blind or visually impaired students and adults for a myriad of purposes, from creating simple tactile graphics and student worksheets to labeling personal belongings

Project Staff: Karen Poppe, Project Leader

Background: Given the positive and enthusiastic reception of the first five packages of *Feel 'n Peel Stickers* that debuted in 2001, the Project Leader was encouraged by parents and teachers to develop a greater and extended variety of adhesive tactile stickers for home and classroom use. Respondents to an earlier survey about possible uses for tactile stickers suggested the following applications: incentives/rewards for grading papers; building discrimination skills; labeling and organizing belongings; creating patterning/sequencing activities; adapting commercial keyboards; preparing and representing bar graphs and pie charts; making simple maps; marking angles and other geometric figures; marking errors on students' papers; labeling books and folders; illustrating spatial concepts; and labeling dangerous household containers.

Work During FY 2003: In May 2003, the idea for four additional sticker packages was submitted to the Product Evaluation Team (PET) and the Product Advisory and Review Committee (PARC); both in-house committees approved the development of future packages.

The product developer began sketching additional sticker packages that included the following:

- Additional Point Symbols
- Star shapes
- Braille Numbers
- Reward Statements

Note: The Project Leader purchased Hot Dots[®], a commercially available product available from Educational Insights, to explore its use of conductive-ink stickers in combination with APH prepared raised-platform stickers. This product might be included in the future Point Symbol sticker packages.

Work Planned for FY 2004: Once the expected designs of the sticker packages are intact, the product developer will conduct a PARC meeting to set a project timeline. APH will forego conducting formal field testing of these packages given their similar structural presentation—that is, same sheet size, same material, same tactile resolution—as the initial *Feel 'n Peel Stickers*. APH will work in tandem with an outside die-cutter to prepare needed embossing plates for new tactile stickers that will ensure expected quality. The Project Leader will prepare a Suggested Uses sheet to accompany the new sticker packages and work with an in-house graphic designer on the final layout of this component prior for production purposes. Quota approval will be requested from the Educational Product Advisory Committee (EPAC).

IntelliTactiles: Pre-Braille Concepts

[formerly IntelliKeys® Research: Phase II] (Continuing)

Purpose: To develop educational activities and companion tactile overlays for use with the IntelliKeys® adaptive keyboard that introduce and reinforce pre-braille concepts.



Project Staff: Karen J. Poppe, Project Leader/Co-Developer
Gerald Abner, Project Consultant/Co-Developer
Kristopher A. Scott, Project Assistant
Tom Poppe, Pattern and Model Maker
Brian Dougherty, Graphic Designer
Matthew A. Poppe, Narrator

Background: The first phase of the *IntelliTactiles* project encompassed efforts to create tactile companion overlays that make IntelliTools® standard print overlays accessible to visually impaired and blind students. *IntelliTactiles: Standard Overlay Companions* are now available from APH. Phase II of the project was broadened to create original overlays that introduce and reinforce pre-braille concepts.

In 2001, the Project Leader began working with Gerald Abner, an assistive technology specialist, to develop an original package of tactile overlays that address pre-braille skills, including shape discrimination, texture recognition, and spatial concepts. Preliminary tasks were focused on the following:

- 1) selecting proper placement of the shapes given the grid limitations of the adaptive keyboard,
- 2) choosing and incorporating a variety of materials to ideally represent smooth, soft, bumpy, and rough textures,
- 3) designing the overlays in a way to assess a variety of pre-braille concepts,
- 4) selecting high-contrast colors for the overlays, and
- 5) ensuring ideal elevation in the thermoform shapes for young tactile learners.

The tactile overlays resulting were titled:

- Texture Recognition I Overlay
- Texture Recognition II Overlay
- Four Shapes Overlay
- Six Shapes Overlay
- Nine Shapes Overlay

- Texture/Shape Recognition Overlay
- Braille Cell Overlay

These overlays introduce and reinforce a myriad of concepts such as above, below, left, right, between, next to, square, triangle, circle, star, rough, smooth, soft, bumpy, row, etc. The *Braille Cell Overlay* even provides early orientation to each dot position in the braille cell configuration.

The prototype was field tested during the second quarter of FY 2002. The evaluators documented the following strengths of the product: good visual contrast, excellent tactile contrast, auditory feedback (especially the child narration), scope of basic concepts reinforced, high interest for the students, helpful guidebook layout, and ease of use. These evaluators also noted that the tactile/visual overlays could be used as stand-alone tactile worksheets apart from the IntelliKeys[®] keyboard. Quiz scripts, therefore, are provided in the accompanying guidebook for this purpose.

Work During FY 2003: Extensive efforts were focused on finalizing the documentation, tooling, and specifications for the final product. Specific activities included the following:

- making master thermoform patterns for the seven overlays
- creating molds for the textured applications
- selecting soft headliner material for some textured areas
- preparing silkscreen artwork
- updating the guidebook content
- finalizing scripts for recording purposes
- conducting additional recording sessions with the child narrator
- checking accuracy of programmed quizzes
- applying final graphical layout to the guidebook
- creating cover art for the packaging folder and outer cover of the guidebook
- readying master CD of programmed quizzed and related CD label artwork
- translating clean file of guidebook for braille production
- creating cutting die for foam pads that will be adhered to back of overlays

Work Planned for FY 2004: The pilot run and production run are still scheduled for FY 2004. The Project Leader will monitor the quality of these production runs and assist in a variety of promotional efforts (e.g., brochure development and demonstrations at conferences and workshops). The development of additional *IntelliTactiles* packages will be dictated by future requests from the field [see separate report on *IntelliTactiles: USB Overlay Companions*].

IntelliTactiles: USB Overlay Companions (New)

Purpose: To adapt IntelliTools' new USB IntelliKeys print overlays for students with visual impairments and blindness by providing tactile equivalents for each

Project Staff: Karen J. Poppe, Project Leader/Author
Tom Poppe, Pattern/Model Maker
Monica Vaught, Research Assistant
Brian Dougherty, Guidebook Layout

Background: In 2001, APH developed and produced *IntelliTactiles: Standard Overlay Companions* that consisted of seven tactile overlays that correspond and register with IntelliTools' standard print overlays. Since the debut of that adapted package of tactile overlays, IntelliTools, Inc. introduced their new USB adaptive keyboard that is accompanied by seven newly configured print overlays. In response to repeated customer requests for tactile overlays to make the new USB overlays accessible for students with visual impairments and blindness, APH's Product Advisory Review Committee (PARC) quickly approved the development of the product and the Project Leader expedited the product through the early stages of development and established an abbreviated timeline. Given that the product mimics the structural design and presentation of *IntelliTactiles: Standard Overlay Companions* (which were thoroughly field tested in May 2000), the Educational Product Advisory Committee (EPAC) issued quota approval for this next package. A letter of permission to proceed with the adaptation of their product was received from IntelliTools, Inc. in March 2003.

Work During FY 2003: The Project Leader designed the tactile layout for the following *USB IntelliKeys Overlays*:

- ✿ QWERTY USB Overlay
- ✿ Basic Writing USB Overlay
- ✿ Alphabet USB Overlay
- ✿ Math Access USB Overlay
- ✿ Web Access USB Overlay
- ✿ Mouse Access USB Overlay
- ✿ Setup USB Overlay

Many decisions were made about the proper tactile presentation, labeling method, and braille abbreviations applied to the companion overlays. A durable, clear rigid vinyl was selected as the ideal material for the overlays. Thermoform masters and silkscreen artwork were prepared for production purposes. The final documentation for the User's

Guide was written by the Project Leader and completed a month ahead of schedule. Final graphic design of the guidebook was readied by the in-house graphic designer, as well as the housing folder artwork and guidebook cover layout. The final tooling task was the transcription of the braille guidebook. Product specifications were finalized in July and distributed to the Product Advisory and Review Committee.

Work Planned for FY 2004: The pilot and production runs of *IntelliTactiles: USB Overlay Companions* are scheduled to take place in the first quarter of FY 2004. The Project Leader will monitor the quality of these initial production runs and assist in preparing promotional materials. The product will be showcased at conferences and workshops in the coming year.

Low-Relief Graph Sheets – .4" (New)

Purpose: To create an embossed graph sheet with grid spacing that corresponds to the line spacing on a braillewriter, so that teachers or students may easily label the horizontal lines when making their own graphs.

Project Staff: Fred Otto, Project Leader

Background: Responses to a questionnaire included with the *Braille Transcriber's Kit: Math* indicated significant interest in a graph paper spaced to allow students to label their own graphs on the braillewriter. As with the other *Low-Relief Graph Sheets* sold by APH, customers would like to be able to purchase them as part of this kit and as separate items. As this product is a continuation of an existing line of similar products, it did not require formal field evaluation.

Work done during FY 2003: The Project Leader experimented with spacings and margins to find an arrangement that works whether the user embosses the front of the sheet or the back. He then worked with the Braille Department to have the design tooled for further experimentation, and communicated the final specifications to Technical Research. Approval for sale under quota was given in May.

Work Planned for FY 2004: This product is expected to be available for purchase in the early part of the fiscal year. No further development work is anticipated.

Princeton-APH World Maps (new)

Purpose: To reproduce and sell a volume of maps made by the Princeton Braillelists on vacuumformed sheets, showing all the regions and

countries of the world, which includes keys and descriptive pages in braille and print. It will be used for studying geography, social studies, history, or current events.

Project Staff: Fred Otto, Project Leader
Tom Poppe, Model Maker

Background: There is a need for high-quality world maps that provide distinctive details through the use of vacuumformed images. While the embossed *APH Braille World Atlas* remains a popular and useful tool, it has received numerous customer criticisms due to its bulky size and lack of tactile differentiation.

The current *Braille Atlas* also violates a number of the guidelines APH promotes for good tactile design. The *Princeton Maps* are closely aligned with the guidelines, and, because they are produced in a medium that allows for variations in relief, they have more distinct definition. The *Princeton Maps* will be produced in a smaller format than the current atlas, making them more portable and useful. They will also be more current than the *Braille World Atlas*, dated 1992.

Work done during FY 2003: The Project Leader obtained several map volumes from the Princeton Braillists and evaluated their content to see which would make useful and saleable APH products. The cost department was consulted to estimate the cost and selling price of a map volume of a given size. The Model Maker was asked to evaluate production methods to handle some unusual features, such as the double-width foldout pages used for some maps.

The Project Leader corresponded with Nancy Amick in Princeton, and together they determined that a general set of maps showing countries of the world would be a good starting place for a collaboration. PARC granted approval to proceed with the project. Ms. Amick agreed to produce several volumes of world maps over the summer for APH to field evaluate. Work on a contractual agreement covering APH's use of Princeton Braillists' original masters began.

Work Planned for FY 2004: Field evaluation of the sample volumes will take place in the new school year; this will help determine whether the product is on the right track or needing to be reworked. The Project Leader and other APH staff will work out details of binding and graphic presentation, and the Model Maker will begin duplicating the foil masters in a durable epoxy.

Setting the Stage for Tactile Understanding (formerly **Tactile Transitions** -continued)

Purpose: To develop a set of materials that will assist young children in making

the cognitive leap from real objects to two-dimensional tactile representations

Project Staff: Karen J. Poppe, Project Leader
Rosanne Hoffmann, Research Assistant
Tom Poppe, Pattern/Model Maker

Background: In 2001 the Project Leader proposed the development of a kit that would bridge children's exploration of real objects with accurate interpretation and recognition of simple raised-line drawings. The existing *Tactile Treasures* kit, produced by APH in 1997, was intended to serve as an informal assessment of a child's understanding of basic concepts related to shape, size, amount, and position through the use of thermoformed worksheets. However, the accompanying guidebook to *Tactile Treasures* stresses the incorporation of real objects and raised line tracings of the thermoformed objects encountered on the worksheets as a way to expose children to the progression from three-dimensional items to abstract representations—essentially an early tactile readiness tool.

To ensure that the progression from real objects to tactile raised-line drawings is presented at an early age, *Setting the Stage for Tactile Understanding* will serve as a prequel and sequel to *Tactile Treasures* by providing all tactile stages in one comprehensive kit. An assortment of real objects that are familiar to most young children will be included. Examples include a comb, pair of scissors, a toothbrush, a block, and a ball.

Thermoformed and simple raised line counterparts to the selected items will be provided as well. Children will be encouraged to create their own raised-line tracings of the included objects using such tools as *Quick-Draw Paper* and the *Draftsman* (see separate report). A secondary objective of *Setting the Stage for Tactile Understanding* is to expose children to a variety of tactile graphic media that they will likely encounter on adapted tests, in transcribed textbooks, and on tactile storybook pages.

Work During FY 2003: After transitioning to the active development stage, the Project Leader conducted the following activities:

- Selected commercially-available items as real objects for the kit. Selected items were chosen because they fell within the scope of a young child's experience, were of a size that could be explored in totality, were conducive to duplication in thermoform and raised-line formats without altering their scale, were easily obtained in various sizes, shapes, and colors for comparison activities, and could be dependably purchased long-term for future production runs.
- Chapters for the guidebook were identified which included the following: *Overture*: Introduction; *Showtime*: Real Objects; *Centerstage*: Thermoformed Objects; *Intermission*: Review; *Finale*: Raised-Line Drawings; *Encore*: Additional Activities; *Curtain Call*: Resources and Bibliography.

- Project Leader initiated composition of the *Showtime* activities that emphasize thorough understanding and hands-on experiences of the various real objects included in the kit. Preparation of the *Centerstage* activities is also underway.
- Project staff purchased and reviewed commercially-available products that could be referenced or included with the kit such as Crayola Model Magic.[®], Wikki Stix[®], tactile puzzles, and pin art kits.
- The project staff built early models of accompanying kit components (e.g., sorting tray, miniature house with textured sides, thermoformed counterparts to the real objects).
- Cover art was designed by a young child that personified selected components of the kit (e.g., spoon, key, and ball) as actors on a stage.

Work Planned for FY 2004: The Project Leader will continue to design the various components of the kit and author accompanying activities. Multiple prototypes of *Setting the Stage for Tactile Understanding* will be readied by the project staff for field test purposes. Needed product modifications will be made based upon reviewers' feedback prior to setting final specifications and readying production tooling.

Tactile Connections: Symbols for Communication [Formerly Tactile Symbol Communication System] (Continuing)

Purpose: To develop a comprehensive set of tactile symbols that is appropriate for use by visually impaired and blind students who lack a formal means of communicating

Project Staff: Tristan Pierce, Multiple Disabilities Project Leader/Author
Karen Poppe, Tactile Graphics Project Leader/Author
Kay Jahnel, Project Consultant/Author
Kim Conlin, Project Consultant/Author
Ann Travis, Research Assistant
Rosanne Hoffmann, Research Assistant

Background: In April 2000, Karen Poppe, Tactile Graphics Project Leader, served as the facilitator of the Tactile Symbol Planning Meeting attended by teachers from the Iowa Braille School, Texas School for the Blind, Maryland School for the Blind, and Perkins School for the Blind. The purpose of the meeting was:

- 1) to review and compare each school's approach toward using tactile symbols,
- 2) to discuss the desired product outcome,
- 3) to discuss wider applications relative to IntelliTools adaptations, and

4) to discuss how APH can facilitate the production of a standardized product.

In March 2001, the *Tactile Symbol Communication System* product idea was presented to the Multiple Disabilities Focus Group; this meeting was facilitated by Tristan Pierce, Multiple Disabilities Project Leader. Although the members of the focus group fully supported the development of this product, they encouraged a re-direction toward creating a system that is not standardized, but one that could be personalized for each individual child.

In FY 2002, the Project Leaders combined their efforts and requested project assistance from Kay Jahnel and Kim Conlin, original members of the Tactile Symbol Planning Committee, to design and develop a unique tactile communication system. Efforts were focused primarily on prototype development. Activities included the following:

- selecting a core vocabulary of tactile symbols;
- determining the shape, color, size, and number of mounting cards;
- selecting symbols for each tactile card for inclusion in the Pictorial Library;
- writing guidebook chapters prepared by both the Project Leaders and contracted authors;
- planning a complete list of expected kit components (e.g., braille/large type labels, construction materials, etc.);
- and developing the look and function of the accompanying interactive CD which will allow teachers/parents to customize Pictorial Libraries to meet individual communication needs of their students/children.

Work During FY 2003: Due to additional time needed by outside consultants to polish and finalize the content of the guidebook during the first quarter of FY 2003, the field test stage was postponed until the beginning of the next school year to ensure sufficient time for reviewers to use and assess the *Tactile Communication System*. Given the extensiveness and complexity of the product, Project Leaders' time was devoted to readying multiple prototypes before September 2003. On-going activities included the following:

- Editing the chapter content submitted by the project consultants
- Identifying needed photographs/artwork to complement the guidebook content
- Preparing multiple packages of mounting cards, accessory materials for card construction, and braille/print labels
- Ready the layout and artwork for the guidebook, related Pictorial Library, and housing binders

Note: Although the interactive CD remains a planned accessory to the kit, the

development of this component will be pursued during the first quarter of FY 2004 and field tested at a later time. However, interest and demand for this component is being surveyed at the initial field test stage.

In August, the Project Leaders contacted possible field test reviewers, many of whom had expressed interest over the past year in this type of product for their nonverbal children. The reviewers will be allowed sufficient time for actual construction of the tactile cards that are individualized for their student(s)/child, as well as time for the student(s)/child to become familiar and proficient in using the tactile cards in his scheduling, choice-making, and communication activities. Therefore, the Project Leaders set February 2004 as the expected due date for completed product evaluations.

Work Planned for FY 2004: After the field testing stage is complete, enormous coordination between Project Leaders, outside consultants, and in-house production will be required to finalize guidebook content, to prepare photographs for the guidebook and related Pictorial Library, to design the guidebook layout and related cover art, to identify and purchase materials from outside vendors, and to create production tooling for the mounting cards. The development of the interactive CD will be an additional focus.

Tactile Drawing Board (New)

Purpose: To provide the Junior model of CareTec's *Draftsman*, a tactile drawing board produced in Austria that allows the creation of instant raised-line drawings using a special mesh material in combination with a padded surface surrounded by a wooden frame

Project Staff: Karen Poppe, Project Leader
Tony Grantz, Manager, Business Development

Background: CareTec's *Draftsman* is a drawing board designed for students and adults with visual impairments and blindness. With the provided special drawing sheets it is simple to make instant tactile drawings by using an ordinary ballpoint pen or stylus. The basic design is very similar to the oft-used *Sewell Raised-Line Drawing Kit*, but is enhanced by its enlarged and secure drawing surface, as well as its non-shiny, mesh-like film that produces very distinct lines. Many uses and applications of this tactile drawing board include the following:

- Producing simple, spur-of-the-moment raised pictures and maps
- Practicing handwriting
- Providing a scribbling or message board
- Allowing visually impaired/blind to be creators of their own artwork
- Illustrating basic concepts related to math, geometry, science, etc.

Work During FY 2003: After reviewing several tactile drawing boards, including the possibility of producing an original design, the Project Leader made the recommendation to the Product Advisory Review Committee (PARC) that APH distribute CareTec's *Draftsman* with minor modifications. The Junior-size *Draftsman* is already provided in a durable carrying case, along with two triangles, one protractor, pins, and 25 pieces of film. Enhancements to the current design would include:

- 1) offering a housing folder for the fragile mesh-like film;
- 2) providing an ideal drawing tool;
- 3) inserting print/braille instructions; and
- 4) modifying the current T-square to include 1-inch and 1/2 -inch tactile indicators.

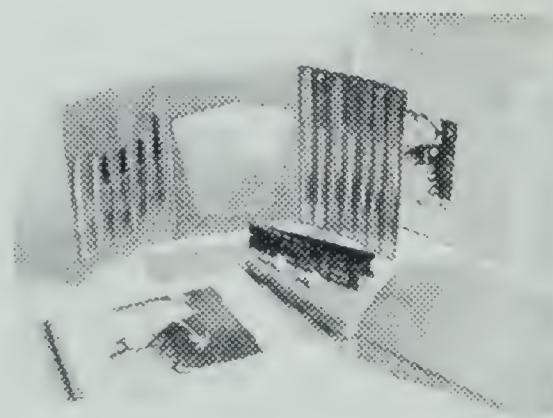
The Business Manager informed CareTec of these re-design expectations, as well as probable sales numbers. Exclusive rights to sell the Austrian-produced product within North America were secured. APH will also make the packages of the special film available separately (for use with the *Draftsman* or with APH's rubber pad that is included in the *Tactile Graphics Kit*). With permission from the Educational Product Advisory Committee (EPAC), both the *Draftsman* and related replacement film will be purchasable through quota funds.

Work Planned for FY 2004: The Project Leader will locate an ideal drawing tool to include with the kit, as well as prepare brief product instructions that will accompany the *Draftsman*. The product will be placed on the active timeline and be expedited through the product development process. The Project Leader will monitor the quality of first production units received from CareTec and then demonstrate the use of the product at future tactile graphic workshops. The offering of this product will expand APH's inventory of available tactile graphic tools and methods for teachers, transcribers, parents, and students to create raised images.

Tactile Graphics Kit Re-Design (Completed)

Purpose: To re-design the existing APH *Tactile Graphics Kit* to reduce its cost, improve its line-drawing tools, and to update its overall appearance and packaging

Project Staff: Karen J. Poppe, Co-Project Leader
Tom Poppe, Co-Project
Leader/Pattern/Model Maker
Kristopher A. Scott, Project Assistant
Bernadette Mudd, Guidebook Layout



Background: The *Tactile Graphics Kit* was developed in the early 1980's by John Barth, a former APH researcher. The kit was designed to provide transcribers, teachers, and Orientation and Mobility specialists a means for constructing tactile graphics on an individual basis using a heavy gauge aluminum foil master. The kit, which includes a variety of line-drawing tools, areal pattern plates, and point symbol tongs, is accompanied by a manual that:

- 1) introduces the proper use of the kit's tools and materials,
- 2) provides information for designing and constructing legible tactile graphics, and
- 3) offers information on training blind students to read tactile maps.

The *Tactile Graphics Kit* continues to be purchased and used today by those creating tactile graphic displays for students with visual impairments and blindness. Based upon extensive and well-documented research, the kit's components can be used to produce the types of lines, point symbols, and areal patterns encountered in most APH textbooks as prepared on the Plate-Embossing Apparatus for Raised Lines (PEARL) machine.

After thoroughly reviewing the current cost of producing the line-drawing tools, the carrying case, and other components included in the *Tactile Graphics Kit*, the Project Leaders outlined their recommended updates and revisions and reported these to the Product Advisory and Review Committee (PARC) in May 2001. The Project Leaders' suggested revisions were supported by the feedback received from experienced transcribers; the respondents also acknowledged that certain items needed improving or omitting. The PARC approved the re-design of this product.

In August 2001, the Project Leaders conducted a PARC meeting to discuss expected updates/changes with other in-house departments. Changes planned included:

- 1) changing the wooden tool rack to a vinyl tool pouch,
- 2) changing the aluminum line-drawing tools to a durable, less costly Delrin[®] material,
- 3) eliminating the paraffin,
- 4) omitting the pantograph,
- 5) making editorial and aesthetic changes to the guidebook, and
- 6) making the outer carrying case less expensive, more portable, and more attractive.

Prototypes of the new line drawing tools and the vinyl pouch, designed by the Pattern/Model Maker, were shown as examples of expected revisions. A feasible schedule was developed by the committee, taking into consideration the remaining inventory of the original kit. The product then advanced to the active timeline.

In early FY 2002, prototypes of the new Delrin[®] line-drawing tools (designed Pattern/Model Maker) were field tested by very experienced tactile graphic designers whom are long-time users of the *Tactile Graphics Kit*. Evaluators represented the states of New Jersey, California, Illinois, and Texas. The reviewers' opinions regarding other planned modifications were garnered as well. Based upon the data collected, the Project Leaders proceeded to implement the design changes initially proposed. Extensive re-tooling to the guidebook, the tools, tactile samples, tool pouch, and outer container was achieved.

Work during for FY 2003: The pilot and initial production runs of the new *Tactile Graphics Kit* occurred in November 2002. The Project Leaders monitored the quality of these initial production runs; no problems arose. The *Tactile Line Drawing Tools* were also produced and made available separately. Karen Poppe had the opportunity to showcase and demonstrate the new kit at the California Transcribers and Educators of the Visually Handicapped (CTEVH) conference and other tactile graphic workshops throughout the year. The new design has marked an increase in the number of sales and interest shown for this established tactile design technique.

Work Planned for FY 2004: The Project Leaders will continue to demonstrate the proper use of the kit for creating foil masters. The possibility of creating a video to demonstrate the kit to new users will be explored.

Tactile Graphics Research (Continuing)

Purpose: To study and develop techniques for making useful tactile graphics, to work toward standards in tactile graphic presentations, and to evaluate product submissions and ideas from the field related to tactile graphics.

Project Staff: Fred Otto, Project Co-Director
Karen Poppe, Project Co-Director

Background: APH has a variety of means for producing tactile graphics, including embossed paper, puff ink, capsule paper, Tactile Vision, and vacuum form. One goal of this research is to learn which media are appropriate for which uses.

In addition, tactile graphic products are frequently submitted by teachers or other professionals who would like to collaborate with APH in producing their materials. Some of these are well researched and well crafted; all merit thorough consideration. Yet another aspect of research is to monitor developments in practice, technology, and philosophy as they evolve.

Work done during FY 2003: Throughout the year, project staff conducted a variety

of tactile graphic workshops and training sessions (both in-house and at national conferences), initiated contacts and gathered input from the field, and proposed new product ideas. Examples of these activities are listed below:

In September 2002, Fred Otto and Karen Poppe, along with other APH staff, attended a workshop by Dr. Christine Roman on Cortical Visual Impairment (CVI).

Project staff conferred with the Technical Research and Purchasing departments to investigate a suitable material to replace the current components in the Parquetry Kit.

Project staff evaluated several phonics books with tactile elements, submitted by a teacher, and discussed their effectiveness with other Research staff.

Karen Poppe and Fred Otto attended the CTEVH Conference in March 2003 and the Texas Focus in June 2003, where they attended sessions, presented, and met with others at the APH exhibit booth. These contacts led to ideas for new products or product improvements and added many new names to the field evaluator database.

Project staff listed and discussed potential research studies that would help answer tactile design questions.

Karen Poppe conducted several on-line surveys to garner feedback from teachers, transcribers, and parents with regard to the need for additional *Picture Maker* accessories and the need for a three-dimensional Orientation & Mobility (O&M) Kit.

Karen Poppe reviewed several products submitted or considered for in-house development, modification, or re-distribution including *VTPlayer* by VirTouch Ltd., *Draftsman* by CareTec, two 3-D O&M Kits, and Leap Frog's *Talking Globe*.

Upon obtaining copies of the preliminary results from BANA's GRASP study of tactile graphic media at the Texas Focus: Tactile Learning Conference, project staff met with Yan Zhang of ATIC to review the findings and discuss their application.

Fred Otto and Tom Poppe experimented with various methods of wetting braille paper and embossing it to see which method produced the best relief and the least breakage of the paper.

An in-house Braille Committee was formed to find ways of ensuring all of APH's braille and tactile production efforts are coordinated and consistent. Project staff participated in the first meeting of the group in August and were eager to lend support to the process.

Fred Otto obtained samples of powders used in thermography and experimented to see if they present a useful small-scale means of making tactile graphics; he concluded they do not because of the inconsistent results and low relief.

Project staff purchased a Swell-Form machine and microcapsule paper for producing quick raised images, which is useful in testing concepts and making simple prototypes of tactile graphics.

Karen Poppe and Tom Poppe experimented with and used a liquid casting resin process to produce more three-dimensional, tactile components for future products such as *Web Chase* [see separate report] and *Setting the Stage for Tactile Understanding* [see separate report]. Based on very encouraging feedback from *Web Chase* field reviewers, Karen Poppe investigated commercially available recreational products that could be easily adapted, modified, or recommended, as is, for the visually impaired population. Original tactile game ideas, like *Web Chase* (designed from scratch for our target population), were given some thought as well. The Project Leader hopes to conduct a focus meeting in FY 2004 that addresses recreational needs for children with visual impairments and blindness, especially targeting/discussing materials that promote the development of tactile readiness skills within a fun context.

In light of the expensive in-house process of producing both braille and print on the same page in product materials such as the *Brain Quest* series, Karen Poppe investigated the availability of duplexing, continuous-form laser printers. Vendor and price information located by the Project Leader was provided to Production staff and the Cost Department for consideration.

Karen Poppe determined re-design specifications for the existing *Puzzle Form Board Kit* and worked with the Model Maker to implement reassigned color, texture, and shape pairings.

Work Planned for FY 2004: These efforts will continue, with a possible emphasis on basic research that will guide product development. Project staff will continue to monitor advances in technology and practice as they relate to tactile design and teaching.

Toys

Staff

Tangle Toy Kit (New)

Purpose: This toy fosters independent play while developing fine motor skills, visual discrimination/identification, tactile discrimination/identification and exploratory skills.

Project Staff: Tristan Pierce, Project Leader
Marie Amerson, Consultant/Author
Valerie Cox, Project Assistant

Background: The *Tangle Toy* is a commercially available toy that was reviewed by the APH Toy Team. Color adaptations were recommended and the manufacturer will make an APH exclusive *Tangle Toy*. The guidebook accompanying the toy will show different color and texture combinations that can be made and how to use them while playing fun games. The guidebook focuses on early childhood, cortical visual impairment, and multiple disabilities.

Work During FY 2003: One half of the color and texture combinations are complete, along with fun activities that children can play.

Work During FY 2004: The Project Leader will complete the manuscript and conduct field testing.

Technical Research Division

Frank Hayden

Technical Research Division

Purpose: To function as a Bridge between the concept of the Project Leader's product and the concrete reality of the production floor. To remain as faithful as possible to the Project Leader's intent and function of the product while making it as inexpensive and as easily produced on the manufacturing plant's floor as possible. The division is involved in all aspects of the product including design work, materials selection, vendor selection, and process development. After developing and documenting the product's specifications the Technical Research Division works with production workers, floor supervisors, upper levels of APH management, and outside vendors to shepherd the Project Leader's product throughout its entire pilot and first production runs.

This development, documentation, and preparation of the product for actual manufacture, along with the monitoring of the manufacturing process by the division, helps to assure the greatest probability of success for a new product

Division staff: Frank Hayden, Manager
David McGee, Manufacturing Specialist
James Robinson, Manufacturing Specialist
Darlene Donhoff, Technical/Clerical Assistant

Work During FY 2003

Accordion Folder Paper, 60 sheets: (Completed) This is an individual product, but is also a part of another new product. That product name changed from *Accordion Paper* and *Accessories Kit* to *Quick Braille Kit*. This product consists of ten sheets of braille paper that are cut to a 17.25" x 5.5" size, scored and fan folded to a size of 2-7/8" x 5.5", which will be sixty sheets of the 2-7/8" x 5.5" size. Technical Research finalized price quotes for having the paper produced and received in-house completely packaged and ready to go directly into stock. Technical Research completed product specifications and documentation. The specifications were turned over to production and Technical Research worked with production to monitor the first run of this product into stock.

APHont Suite: (New Product) This product is an expansion of *APHont* that will offer more fonts. This product will only be distributed on the Internet. It will not actually be produced on the APH production floor. Tooling for this product is near completion and the product should be ready for Internet distribution in the near future.

Armadillo Army: (New Product) This product is an APH developed software version of a child's game. Standard packaging in CD format. Technical Research has finished

about 90% of product specifications and will monitor the first production run of this product.

Basic Science Tactile Graphics Kit: (Completed) Technical Research completed product documentation and specifications. Technical Research converted the Project Leader's graphic designs into 270 computer drawings. These were then used to generate engraved patterns, which took over 100 individual set-ups on the router, and were used by the Model shop to make vacuum form masters. Technical Research followed the first production run through completion.

Book Port: (Completed) This product was formally called *Road Runner II*. This product is an electronic book reading device and consists of the unit, headphones, software on CD, four AA batteries, and a flashcard memory device. This item is also a pass through product (a non-APH manufactured product). Technical Research worked with the Project Leader to develop product specifications. Technical Research scheduled and coordinated delivery and the testing of the product with the Purchasing Department and the Project Leader. Technical Research followed the first shipment from receipt to stocking of the product.

Book Wizard Producer: (New Product) This product is a composing program for books on CD. Technical Research has completed product specifications on this product. However, the Project Leader is changing the product slightly to better satisfy customer requirements. Technical Research will revise product specifications should the product development require it. Technical Research will monitor this product through its first production run.

Book Wizard Reader: (New Product) This product is a reading program on CD. Technical Research has completed product specifications on this item and distributed them to production departments. Technical Research will monitor the first production run of this product.

Braille DateBook: (New Product) Technical Research worked with the Project Leader and Vendors to specify, test, and evaluate closure mechanisms on the Binder. Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

Braille DateBook Calendar Tabs: (New Product) This is a new product, which will be sold individually and will also be part of the *Braille DateBook Kit*. Technical Research worked with the Project Leader to develop and produce prototype Calendar Tab Dividers. Technical Research specified materials, developed and specified braille layout, and created files to have the Cutting Dies made. Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

Filler Paper/Blank Tab Dividers: (New Product) This is a new product, which will be sold individually and will also be part of the *Braille DateBook Kit*. Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

Braille Production Study, Manufacturing Methods Study: (Completed) Technical Research worked with the Project Leader to specify materials and production processes for a study of common braille production methods. Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research worked with the Project Leader to monitor the product as it went through production.

Braille Rap Song: (New Product) This product was originally to be recorded by an outside band. Due to scheduling conflicts for the band, this song will now be recorded by an in-house group of APH employees. Technical Research will follow the progress of the recording, as well as develop and distribute product specifications at the appropriate time. Technical Research will monitor this product's first production run.

Braille Transcribers' Kit: Math: (Revised Product) This is a re-design of the kit. Several sets of new diagrams were added including Venn Diagrams and a new 0.400" square grid sheet. Technical Research completed all ECR (engineering change request) requirements to document product revisions. Technical Research will monitor the first production run of this product revision.

Braille Transcribers' Kit: U.S. Maps: (New Product) Technical Research worked with Project Leader and Production to develop an alternative production method to satisfy the Project Leader's objective and improve production efficiency. Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

Bright Line Reading Guide, Pink: (Completed) Technical Research designed and fabricated tooling in the form of silk screen art, a silk screen, and designed and purchased a cutting die. Technical Research completed and distributed specifications. Technical Research worked with the Project Leader to monitor the first production run of this product. Product was successfully completed and put into stock.

Bright Line Reading Guide, Yellow: (Completed) Technical Research designed and fabricated tooling in the form of silk screen art, a silk screen, and designed and purchased a cutting die. Technical Research completed and distributed specifications. Technical Research worked with the Project Leader to monitor the first production run of this product. Product successfully completed and put into stock.

College Ruled Boldline Spiral Notebook: (New Product) Technical Research met with the Project Leader to establish the basic makeup of the product (materials, binding, etc). A Product Advisory and Review Committee (PARC) meeting has been scheduled by Technical Research for later in August.

Color Test II: (Completed) Technical Research developed procedure and acquired necessary materials for quality control testing of Color Test II units. Technical Research worked with Purchasing Manager and Vendor in performing environmental testing of the unit. An APH logo sticker was placed on the approved unit. Technical Research completed product documentation and specifications and turned them over to production. Technical Research monitored the first production run of this product.

Crafty Graphics Video: (New Product) Technical Research met with the Project Leader and Production areas to set timeline dates for the schedule. Technical Research will complete and turn over product documentation to production and will monitor the first production run into stock.

Denver the Guide Dog, A Video: (Completed) This product was a subcontracted product. Technical Research completed and distributed product specifications, finalized the braille tooling, and worked with the Purchasing Department and Vendor to produce the product. Technical Research worked with the Project Leader to monitor the first run of the product through the quality control checks and into stock.

Electronic Talking Glow Dice: (New Product) Technical Research designed the circuitry and fabricated 25 prototype designs of the printed circuit boards and the cases for field-testing. Following field testing, Technical Research worked with the Model Shop to coordinate the electronics fitting into the final case design. Technical Research, the Project Leader, the Model Shop, and Purchasing worked to solicit outside bids for the product. The selected Vendor is currently working on producing four to five production samples for APH to test, prior to a full production run. Technical Research, along with the Project Leader and the Model Shop, will evaluate these samples for approval to produce. The Project Leader and Technical Research will monitor the first production of this item through receipt, and testing of the product, and through the final packaging and stocking.

Envision I: Vision Enhancement Kit and Curricula for Distance Devices: (Completed) Technical Research worked with the Project Leader and completed product documentation and specifications for five of the seven separate products. There is the kit without the monoculars and the full kit with the monoculars. There is a *Print Teacher's Manual for Students Ages 10 years and Under*, a *Print Teacher's Manual for Students Ages 11 years and Older*, which are part of the kits and are sold individually. There is a *Consumables Package*, which goes in both Envision I and II kits. Technical Research worked with the Project Leader and the production departments to monitor the first production run.

Envision I: Braille Teacher's Manuals for ages 10 years and Under & Braille Teacher's Manual for ages 11 years and Older: (New Product) Technical Research has just completed the product specifications for the braille versions of the two manuals and will be turning them over to production. These braille manuals are not included in the kits, but are made available upon request.

Envision II: Vision Enhancement Kit and Curricula for Near Magnification Devices: (Completed) Technical Research worked with the Project Leader and has completed product documentation and specifications for seven of the nine separate parts. There is a kit without the magnifiers and a full kit with the magnifiers. There is a *Print Teacher's manual for Students Ages 10 years and Under*, a *Print Teacher's Manual for Students Ages 11 years and Older*, which are part of the kits and are sold individually. There is a *Student Activities Binder for Ages 10 years and Under*, and a *Student Activities Binder for Ages 11 years and Older*, and a comic book (5 to a pack), all of which are included in the kits and are sold individually. Technical Research worked closely with the Project Leader and production departments to monitor the first production run.

Envision II: Braille Teacher's Manuals for ages 10 years and Under & Braille Teacher's Manual for ages 11 years and Older: (New Product) Technical Research has just completed the product specifications for the braille versions of the two manuals and will be turning them over to production. These braille manuals are not included in the kits, but are made available upon request.

EZ Track Calendar 2004: (Completed) The name was changed from *MasterPlan* to *EZ Track*. Technical Research took over this product as Project Leader last year. Technical Research worked with the Communications Department to create new calendar cover art and set up the calendar layout. Technical Research developed specifications, turned them over to production, and monitored the production of this product into stock.

EZ Track Calendar Inserts 2004: (Completed) The name was changed from *MasterPlan* to *EZ Track*. Technical Research took over this product as Project Leader last year. Technical Research worked with the Communications Department to create new calendar cover art and set up the calendar layout. Technical Research developed specifications, turned them over to production, and monitored the production of this product into stock.

EZ Track Financial Record Keeper: (New Product) The name on this product was changed from *MasterPlan* to *EZ Track*. Technical Research worked with the Project Leader, Production, and a Vendor to resolve tooling problems. Technical Research completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

EZ Track Financial Record Keeper: Check Register Pkg. (2 pack): (Completed) This is an individual product and is also part of the *EZ Track Financial Record Keeper Kit*.

Technical Research completed product documentation and specifications and turned them over for production. Technical Research worked with the Project Leader in monitoring the product as it went through production.

EZ Track Financial Record Keeper Replacement Sheets: (Completed) Technical Research completed product documentation and specifications and turned them over to production. Technical Research worked with the Project Leader to monitor the product as it went through production.

Find It Object Locator: (New Product) Technical Research designed the circuitry and fabricated one prototype transmitter and 5 prototype receivers to demonstrate the concept to the Project Leader. The Project Leader favorably received the design. However, in subsequent research, it was uncovered that a similar item was commercially available and the project has been discontinued by APH.

Flat Stylus, Large Yellow: (Completed) Technical Research has completed product documentation and specifications and has turned them over for production. The first production of this stylus has been received and placed into stock. This stylus is also included in two other new products.

Flat Stylus, Small Green: (Completed) Technical Research has completed product documentation and specifications and has turned them over for production. The first production of this stylus has been received and placed into stock.

Functional Skills Assessment: (New Product) The name was changed to *Functional Assessment/Curriculum*. Technical Research will be meeting with the Project Leader for an overview of the product. Technical Research will begin work on product specifications and documentation as determined by the product timeline schedule.

Functional Vision Video: (Completed) This product was a subcontracted product. Technical Research completed and distributed product specifications, finalized braille tooling, and worked with the Purchasing Department and the Vendor to produce the product. Technical Research worked with the Project Leader to monitor the first run of the product through the quality control checks and into stock.

Guided Art Stories: (New Product) This product consists of a binder, a print manual, and three cassettes. Technical Research completed product specifications and documentation and turned them over to production. Technical Research will work with the Project Leader in monitoring the first production run of this kit into stock.

IntelliTactiles: Pre-Braille Concepts: (New Product) Technical Research worked with the Project Leader to create electronic files for the silk screen patterns. Technical Research created electronic file and specifications for cutting dies to be made to produce custom shaped, backing material for the overlays in the kit. Technical Research has completed product documentation and specifications and turned them over for production.

Technical Research will work with the Project Leader to monitor the product as it goes through the first production run.

IntelliTactiles: Pre-Braille Concepts, Print Manual: (New Product) Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

IntelliTactiles: Pre-Braille Concepts, Braille Manual: (New Product) Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

IntelliTactiles: USB Overlay Companions: (New Product) Technical Research worked with the Project Leader to create electronic files for the silk screen patterns. Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through the first production run.

IntelliTactiles: USB Overlay Companions, Print Manual: (New Product) Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

IntelliTactiles: USB Overlay Companions, Braille Manual: (New Product) Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

Invisiboard: (New Product) This product is essentially a blackout board to be used for teachers to create an area of simple and stark contrast to highlight objects that a teacher wants their low vision student to focus on. The large, collapsible board has white loop material on one side and black loop material on the other. Technical Research met with the Project Leader early on in this project to establish the basic make up of the product. The Model Shop pattern maker is currently fabricating prototypes to use for field-testing. Technical Research will complete the specifications for this product and monitor its progress through its first production run.

ISAVE Visual Fields/Acuity Grid: (Completed) Technical Research created the silk screen art and the silk screen used to print on the board. Technical Research worked with the Project Leader in monitoring the first production run of this product into stock.

ISAVE 101: (New Product) The product name has been changed from *ISAVE II* to *ISAVE 101*. Technical Research is working with the Project Leader to complete product specifications and documentation for production. Technical Research will turn the

specifications over very shortly and will follow the first production run of the DVD into stock.

JaJo Braille Pocket Calendar 2003: (Completed) Technical Research worked with the Communications Department to create the tooling for the print portion of the product and with production to create the braille plates for the product. Technical Research worked with the Project Leader to monitor the production run of this item into stock. Please note: The *JaJo Calendar* will no longer be produced after the 2003 model.

K-FAST Large Print Edition: (New Product) Technical Research has been working with the Project Leader and the Communications Department to finalize the product layout. Specifications are approximately 90% complete. Technical Research will work with the Project Leader to monitor the product as it goes through production.

K-FAST Braille Edition: (New Product) Technical Research worked with the Project Leader to develop final product design by creating a mock-up of book layout. Technical Research has been working with the Project Leader and Communications Department to finalize product layout. Specifications are approximately 90% complete. Technical Research will work with the Project Leader to monitor the product as it goes through production.

Labeling Tool Kit: (New Product) This is a new product, that will consist of three parts: a braille version, a Large Type version, and a Cassette version. Technical Research will be working with the Project Leader to determine production methods and materials to be used. Since this project has had a schedule revision, Technical Research will begin designing product specifications and documentation in late 2003 or early 2004.

Large Print/Braille Toss-Away Ruler: (Completed) Technical Research created all the artwork for the print portion of this project and did the layout for the braille tooling of this project. Technical Research designed and acquired the cutting die needed for this product. Technical Research completed and distributed specifications on this product. Technical Research worked with the Project Leader to monitor the first production run of this product through placing it into stock.

Large Print Toss-Away Ruler: (Completed) Technical Research created all artwork for the print portion of this project. Technical Research designed and acquired the cutting die needed for this product. Technical Research completed and distributed specifications on this product. Technical Research worked with the Project Leader to monitor the first production run of this product through placing it into stock.

Large Type Atlas: (New Product) Technical Research will be working with the Project Leader to facilitate the design and fabrication of the tooling needed on this project. This is going to be a long-term project, and Technical Research will be developing product specifications as this project becomes more solid.

Light Box Materials Kit: Levels 1, 2, and 3 Spanish Versions: (New Products) The existing *Light Box Materials Kits* are going to be produced with Spanish print. Technical Research is working with the Project Leader to develop product documentation and specifications once all the Spanish translation is completed and has been field-tested.

Light Box Materials Kit: Levels 1, 2, and 3 Large Type Upgrade English Versions: (New Products) The existing Light Box Kits have regular print, which will be upgraded and printed in large type. Technical Research is working with the Project Leader to develop product documentation and specifications once the Spanish translation is completed, so that the large type will match the Spanish version.

Lot's of Dots: Learning my ABC's: (New Product) Technical Research worked with the Project Leader to make samples for pre-field-testing, which were approved and then sent to the production departments to get a sample prototype made for field-testing. Technical Research designed the tooling needed for making the plastic template. Technical Research completed product documentation and specifications and turned them over to production. Technical Research is working with the Project Leader to monitor the first production run of this product.

Low Relief 0.400" 20x19 Grid Pack: (New Product) This product will go into *Braille Transcribers' Kit: Math* and will also be sold individually. Technical Research completed product specifications including developing new bills of material for this product. Technical Research will monitor the first production run of this product.

Mate Math: (New Product) Technical Research worked with a Vendor in Japan (BrailleCom) to develop cost estimates based on concept drawings and written guidelines. After much discussion with the Vendor and the Project Leader, it was decided that there would be a small (100 sheet) trial run of 1 sheet out of the estimated 4 sheets needed for the product. The Project Leader is currently working on furnishing Technical Research with the desired content for this test. Technical Research will then furnish the Vendor with conceptual drawings and written guidelines to follow when quoting on and manufacturing the trial run. Following approval of the trial run, Technical Research will finalize product specifications, formally document, and distribute those specifications. Technical Research will then monitor the first production run through putting the product into stock.

Moving Ahead: Tactile Graphic Storybook *Goin' on a Bear Hunt*: (New Product) This will be the first of the four books to be produced in the *Moving Ahead Series*. Technical Research is working with the Project Leader to finalize the materials and production procedures for producing this book. Technical Research is completing the product documentation and specifications and getting this book ready to begin the first production run.

Moving Ahead: Tactile Graphic Storybook *Splish the Fish*: (New Product) Technical Research worked with the Project Leader in designing the layouts for the cutting

dies and the braille plates to make the clear adhesive back sheets for grade one and grade two versions of sticker words, which the consumer will attach over the printed words on the proper pages. Care was taken to coordinate the size of dies and spacing to the standard TED braille output spacing. Technical Research will be ordering the dies for these three *Moving Ahead* books in the near future. Technical Research has begun very basic product specifications for this book and will work more on this one as the first book's specifications are completed.

Moving Ahead: Tactile Graphic Storybook *The Boy and the Wolf*. (New Product)

Technical Research worked with the Project Leader in designing the layouts for the cutting dies and the braille plates to make the clear adhesive back sheets for grade one and grade two versions of sticker words, which the consumer will attach over the printed words on the proper pages. Care was taken to coordinate size of dies and spacing to the standard TED braille output spacing. Technical Research will be ordering the dies for these three *Moving Ahead* books in the near future. Technical Research has begun very basic product specifications for this book and will start finalizing product specifications once *Splish the Fish* specifications have been completed.

Moving Ahead: Tactile Graphic Storybook *Turtle and Rabbit*. (New Product)

Technical Research worked with the Project Leader in designing the layouts for the cutting dies and the braille plates to make the clear adhesive back sheets of both grade one and grade two versions of sticker words, which the consumer will attach over the printed words on the proper pages. Care was taken to coordinate size of dies and spacing to the standard TED braille output spacing. Technical Research will be ordering the dies for these three Moving Ahead books in the near future. Technical Research has begun very basic product specifications for this book and will start finalizing product specifications once *The Boy and the Wolf* specifications have been completed.

On the Way to Literacy: Alphabet Scramble: (New Product) This product was postponed due to unfavorable field testing reviews of the book as some reviewers felt the book was boring. The book will be re-worked to add visual and content interest for the reader. Technical Research will be working with the Project Leader to develop specifications for this project. Technical Research will monitor the progress of this product from its first production run to stocking the product in inventory.

On the Way to Literacy Teacher's Handbook: (Revision) This product is a re-design of the existing teacher's handbook. Technical Research will be working with the Project Leader to document the desired changes. Technical Research will put through an Engineering Change Form (ECR) to formally document the product changes. Technical Research will monitor the first production run of the revised product.

Parenting Book: (New Product) This project has had a schedule revision. Technical Research will begin work documenting product specifications in mid 2004.

Parenting Book, Large Type: (New Product) This project has had a schedule

revision. Technical Research will begin work documenting product specifications in mid 2004.

Parenting Book, Cassette: (New Product) This project has had a schedule revision. Technical Research will begin work documenting product specifications in mid 2004.

Patterns Library Series, Primer Level: Print Edition: (Completed) Technical Research has worked with the Project Leader to develop product documentation and specifications. Technical Research has completed the documentation and turned it over to production. Technical Research worked with the Project Leader and monitored the first production run of the product.

Patterns: (Revision) This is a new product, and Technical Research met with the Project Leader to get an overview of the product in order to begin work on the product specifications and documentation.

Periodic Table of Elements: (New Product) Technical Research will begin preliminary meetings with the Project Leader in the near future. Technical Research will develop product specifications for this product, assist as needed with tooling, and will monitor the product's first production run.

Picture Maker Video: (Completed) This product was a subcontracted product. Technical Research completed and distributed product specifications, finalized braille tooling, and worked with the Purchasing Department and the Vendor to produce the product. Technical Research worked with the Project Leader to monitor the first run of the product through the quality control checks and into stock.

PocketViewer: (Completed) This product is a pass through (a non-APH manufactured product). It is a hand-held self-contained camera for enlarging print items. Technical Research worked with the Project Leader and Purchasing Department to procure this item. Technical Research monitored the first shipment of this item through putting it into stock.

Pop-A-Cell: (Completed) Technical Research completed and distributed product specifications on this item. Technical Research created tooling needed for the lettering in the molds on this product using the computer-controlled router. Technical Research worked with the Project Leader to monitor the first production run of this product through stocking the product on the shelf.

Portable Sound Locator IV: (New Product) This is going to be a remote controlled version of the *Portable Sound Source*. Technical Research designed and developed the circuitry for this device. Technical Research has fabricated a very basic prototype for the Project Leader to review. Following finalization of the design Technical Research will fabricate 10 to 15 prototypes for field-testing. Upon completion of field testing, Technical

Research will finalize drawings, schematics, and written guidelines in order to obtain price quotes from vendors.

Power of the Dream CD: (Completed) This is a new product that has already gone into stock. Technical Research worked with the Project Leader and completed product documentation and specifications to insure that the next production will be made with no problems.

Preschool Activities Calendar, Large Print/Braille: (Completed) This product is a new large print/braille version of the original activities calendar. Print is now in a large type format and there is braille in this product as well for accessibility. In the absence of the original Project Leader, Technical Research assumed the duties of the Project Leader as well as completing the normal Technical Research responsibilities for this project. Technical Research completed product specifications and followed this product through its entire first production run.

Primary Math Units Kit and Work Sheets: (New Product) Technical Research has completed product specifications and documentation. Technical Research continued working with the Project Leader in having prototype samples developed for field-testing. The prototype samples were completed and have been sent out for field-testing. Technical Research will work with the Project Leader on the rest of the individual units as they are completed and readied for production.

Printing Guide: (New Product) This product is a mechanical template to help teach printing skills. Technical Research designed and fabricated several versions of the concept for the Project Leader's review. Technical Research produced 10 each of the 2 preferred designs. The Project Leader is in the process of preliminary field-testing. Technical Research will design and fabricate tooling for this project as needed and will produce product specifications on this item. Technical Research will follow this product through its entire first production run.

Psychoeducational Assessment Video: (New Product) The Project Leader discovered there is a new edition of this test coming out. The new edition is being reviewed by the Project Leader to determine the proper course of action on this project. Technical Research will provide specifications on this product and monitor the product's entire first production run.

Puzzle Form Board Kit: (Revised) This product was revised to lower the manufacturing cost and to also improve the quality and consistency of the puzzle pieces. Technical Research completed product documentation and specifications and turned them over for production. Technical Research monitored the first production run of the revised product.

Quick Braille Kit: (Completed) This product name changed from *Accordion Paper and Accessories Kit* to *Quick Braille Kit*. This product will consist of one package of

Accordion Folded Braille Paper, a Large Yellow Flat Stylus, a 6 line, 19 cell India slate, and a vinyl pocket protector to hold all the items. Technical Research finalized the price quotes for the items that had to be purchased and completed product specifications and documentation. The specifications were turned over, and Technical Research worked with production and the Vendors to monitor the first run of this kit into stock.

Quick Pick Braille: (New Product) This is another in the series of *Quick Pick* products and was just added to the active timelines schedule. Technical Research will soon be meeting with the Project Leader to determine the product materials and to establish timeline dates.

Quick Pick Counting: (New Product) Technical Research worked with the Project Leader to test heavier paper stock for test cards. Technical Research completed product documentation and specifications and turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

Rolling into Place: Book 1 of the Rolling Right Along Series: (Completed) Technical Research completed product specifications and documentation. Technical Research worked with the Project Leader in monitoring the first production run of this product into stock.

Sample Test 1, Cassette Version: (New Product) This product is a sample test to be furnished by APH's Accessible Tests Department to those needing examples of how to adapt a written test to this media for low vision use. This product has had a very compressed development cycle (late June to mid September) Technical Research developed product specifications and is currently monitoring this product's first production run.

Sample Test 1, CD Version: (New Product) This product is a sample test to be furnished by APH's Accessible Tests Department to those needing examples of how to adapt a written test to this media for low vision use. This product has had a very compressed development cycle (late June to mid September) Technical Research developed product specifications and is currently monitoring this product's first production run.

Sample Test 1, Large Type Version: (New Product) This product is a sample test to be furnished by APH's Accessible Tests Department to those needing examples of how to adapt a written test to this media for low vision use. This product has had a very compressed development cycle (late June to mid September) Technical Research developed product specifications and is currently monitoring this product's first production run.

Sample Test 1, Braille Version: (New Product) This product is a sample test to be furnished by APH's Accessible Tests Department to those needing examples of how to

adapt a written test to this media for low vision use. This product has had a very compressed development cycle (late June to mid September) Technical Research developed product specifications and is currently monitoring this product's first production run.

Science Skills Inventory: (New Product) Technical Research and the Project Leader have had an initial product development meeting with production and set a timeline schedule. Technical Research will begin work on preliminary product specifications and materials.

Sense of Science: Animals Kit: (New Product) Technical Research has worked with the Project Leader and the Model Shop to create electronic files for the lettering used in the silk screen art. Technical Research completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

Sense of Science: Animals Guidebook, Print: (New Product) Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

Sense of Science: Animals Guidebook, Braille: (New Product) Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader to monitor the product as it goes through production.

Sensory Learning Kit: (New Product) This is a redesign of the *Sensory Stimulation Kit (SSK)*, but will essentially become a new product. Technical Research has worked with the Project Leader, the Purchasing Department, and an outside Vendor to locate acceptable replacement items that are more functional and better suited to the purpose of the kit. Technical Research has fabricated several vibrating pillow prototypes and has worked with the vendor on the design of a controlled power source for these items. Technical Research will continue to work with the Project Leader and the Vendor through the development of the product. Following field testing, Technical Research will finalize all designs and specifications. Technical Research will follow this product through its entire first production run.

Setting the Stage for Tactile Understanding: (New Product) The name has been changed from *Tactile Transitions: Real Objects* to *Raised Line Representations*. Technical Research will meet with the Project Leader to begin work on product specifications. Technical Research will produce and distribute product specifications and will monitor the product's first production run.

Slate, Lightweight Aluminum 6 Line, 19 Cell with Stylus: (Completed) The slate is purchased from India and will be packaged with a *Large Flat Yellow Stylus* and put into

stock. Technical Research has worked with the Project Leader and the Purchasing Department to procure this item. Technical Research worked with the Project Leader monitoring the first shipment of this item into stock.

Slate, Lightweight Aluminum 4 Line, 28 Cell with Stylus: (Completed) The slate is purchased from India and will be packaged with a *Saddle Stylus* and put into stock. Technical Research has worked with the Project Leader and the Purchasing Department to procure this item. Technical Research worked with the Project Leader monitoring the first shipment of this item into stock.

Slate, Lightweight Aluminum 4 Line, 37 Cell with Stylus: (Completed) The slate is purchased from India and will be packaged with a *Saddle Stylus* and put into stock. Technical Research has worked with the Project Leader and the Purchasing Department to procure this item. Technical Research worked with the Project Leader monitoring the first shipment of this item into stock.

Sound Ball: (New Product) Technical Research designed the circuitry for the electronics of the ball and fabricated 12 printed circuit boards with speakers, a level switch, and battery leads attached. These were forwarded to an outside engineering firm contracted to make the housing for the electronics and to foam the ball material around the entire housing assembly. This was done in order to build the prototypes needed for field testing work. Upon receipt of the first prototype, the engineer's design of the housing was found not to protect the electronics sufficiently. The prototypes were tested and examined by Technical Research and the APH Model Shop Mold Maker. A decision was made that the APH Model Shop would completely re-design the housing for the electronics and produce them in-house at APH. Technical Research will then adapt or re-design the electronics to fit the new housing and to incorporate some new features. The APH Model Shop is also experimenting with foaming materials, and it is possible the entire prototype run will be fabricated at APH. If it proves to be more viable for the foaming company to do the foaming work, then the assembled housings, with the electronics, would be sent to the manufacturer to be foamed as the finished ball. Technical Research will continue working with the Project Leader and the APH Model Shop to produce prototypes for field-testing. Upon completion of field testing and product revisions, Technical Research and the Model Shop will produce drawings and written guidelines for the Purchasing Department to use in obtaining competitive bids from outside vendors. Technical Research will work with the Project Leader to monitor the first production run of this product.

Student Miniguide: (New Product) This product will be a pass through item, a (non-APH-manufactured product). This product is a hand-held device that will alert the user, through either vibration or tone, of objects in his/her path and the approximate distance. Technical Research has worked with the Project Leader and Purchasing to procure the item. Technical Research will monitor the first shipment of this product into stock.

Students' Starter Pack: (Completed) Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research monitored the first production run of the product into stock.

Studio Recorder: (Completed) Technical Research worked with the Project Leader and Purchasing to standardize software packaging. Technical Research worked with the Project Leader to monitor this product's first production run through putting the material into stock.

Tactile Connections: Talk of the Town: (New Product) Technical Research will develop product specifications and monitor this product's first production run following field-testing and the finalization of the product design.

Tactile Graphics Kit: (Completed) This was a complete redesign of an existing product. With the redesign, the line drawing tools are now to be sold as a separate item, apart from the full kit. Technical Research worked with the Project Leaders in completing new specifications and documentation for the redesigns. Technical Research worked with the Project Leader to monitor the product's first production run.

Tactile Graphics Large Print Guidebook: (Completed) Technical Research worked with the Project Leader to monitor the product's first production run through putting the item into stock.

Tactile Line Drawing Tools: (Completed) Technical Research worked with the Project Leader to monitor the product's first production run through putting the item into stock.

Talking Word Puzzles, CD Version: (New Product) This is a standard software package on CD. Technical Research and the Project Leader have had an initial product development meeting with production to set the timeline schedule. Technical Research started product documentation and specifications and is about 80% complete. Technical Research will work with the Project Leader in monitoring the first production run of the product.

Tangle Toy Kit: (New Product) Technical Research and the Project Leader have had an initial product development meeting with production and set a timeline schedule. Technical Research will begin preliminary work on specifications after prototype has been through field testing and evaluation. Technical Research will be available to help fabricate tooling or prototypes as needed on this item.

Teen Scene; Portrait of Success DVD: (Completed) Technical Research worked with the Project Leader in completing product specifications. This was the first DVD to be produced by APH. Technical Research completed and turned over product documentation and monitored the quality control checking of the product and placing the DVD into stock.

Teen Scene; Portrait of Success Video: (Completed) Technical Research worked with the Project Leader in completing product specifications. Technical Research completed and turned over product documentation and monitored the quality control checking of the product and placing the video into stock.

Teacher's Pet: (New Product) Technical Research completed product documentation and specifications and turned them over to production. Technical Research will work with the Project Leader in monitoring the first production run of the product.

Teaching the Student with a Visual Impairment: (Completed) This product's name was changed from *Protocols for the Observation and Recording of Visual Behaviors Kit*. Technical Research completed product documentation and specifications and turned them over to production. Technical Research worked with the Project Leader in monitoring the product as it went through the first production run.

Teaching the Student with a Visual Impairment, Materials Packet: (Completed) This is an individual product and was also part of the *Teaching the Student with a Visual Impairment Kit*. Technical Research completed product documentation and specifications and turned them over to production. Technical Research worked with the Project Leader to monitor the product's first production run.

Teaching Touch:. (Completed) Technical Research completed product documentation and specifications and turned them over to the production areas. Technical Research worked with the Project Leader in getting the first production run completed and in stock.

Termite Torpedo: (Completed) This product is an APH developed game on CD. Technical Research completed product specifications and distributed them to production departments. Technical Research worked with the Project Leader to monitor the first production run of this product through placing the item into stock.

Test Access: Guidelines for Computer Administered Testing of Students Print Kit: (Completed) This product is being distributed on the Internet. Technical Research completed and turned over product specifications.

Textured Paper Collection: (New Product) Technical Research has met with the Project Leader to discuss this project and its parts. Timeline dates were set for part of the schedule. The Project Leader has this out for field-testing and once the revisions have been confirmed, Technical Research will begin working on product specifications.

The Gathering, Greeting Card: (Completed) Technical Research worked with the Project Leader to develop and complete product documentation and specifications. Technical Research distributed the product documentation and specifications. Technical

Research worked with the Project Leader and the Purchasing Department in following the first production run through completion.

Time for Art: Art Projects and Lessons for the Visually Impaired: (Completed) Technical Research completed product documentation and specifications and turned them over to production. Technical Research worked with the Project Leader and monitored the first production run of this product through placing the item in stock.

Turbo Phonics: (New Product) This product had its name changed from *Video Audio Phonics Presentation or VAPP* to *Turbo Phonics*. This is a software package on CD, with a print manual and possibly a print workbook. Technical Research and the Project Leader have had an initial product development meeting with production to set a timeline schedule. Technical Research has begun preliminary product specifications.

Using the Cramner Abacus for the Blind, Spanish Version: (New Product) Technical Research will be working with the Project Leader in developing product specifications and documentation for this product.

Verbal View of Windows XP, Daisy CD Version: (New Product) Technical Research has completed product documentation and specifications and has turned them over for production. Technical Research will work with the Project Leader in monitoring the first production run of the product.

Verbal View of Word: (New Product) Technical Research will work with Project Leader to produce a standard CD and packaging. A meeting will be scheduled for Technical Research and the Project Leader to discuss the project and to establish timeline dates. Technical Research will begin work on product specifications after that meeting.

WebChase: (New Product) Technical Research has worked with the Project Leader, the Model Shop, and the Communications Department to specify the tooling required to produce some of the game board items. Technical Research created electronic files for manufacturing five cutting dies to be used on components of the kit. Technical Research has started product documentation and specifications, which are approximately 75% complete. Technical Research will work with the Project Leader to monitor the first production run.

Woodcock-Johnson III Psychoeducational Battery: (New Product) Technical Research and the Project Leader are planning to schedule an initial product development meeting with production to set the timeline schedule.

Word Player: (New Product) Technical Research worked with the Project Leader to develop standardized software package and product specifications. Technical Research has turned all product specifications over to production and will help in monitoring the first production run of the product.

Other Technical Research Projects

Router Projects: Technical Research completed conversion of all jobs set up for the old router to the new router system. More than 30 jobs now have a set up procedure specific to that product. Technical Research has also adapted several new items to the automated router that had been previously cut by hand on inverted routers or portable routers. Technical Research remains available for the support of production as needed and will continue to adapt existing jobs and new products to the automated router as needed.

ATIC Tactile Visions Process: The transfer of the process from Technical Research to the production floor has been successfully completed. Technical Research remains available to provide production support when requested and to introduce tooling for new products for the tactile vision process.

Light Box redesign: Technical Research completed the process for obtaining UL approval for a newly designed dimmer circuit for the light box. This design change was necessary due to government mandated improvements in energy efficiency. This process spanned a period of nearly nine months to fulfill sampling, investigative, and destructive testing requirements for UL.

Mini-Lite Box Redesign: Technical Research redesigned the dimming circuit to allow for easier and more accurate calibration of light level settings by the manufacturer. Technical Research tested prototype samples sent by the vendor prior to full production. The Vendor, APH production personnel, and APH repair technicians, all like the design change.

Portable Sound Source redesigns: Technical Research redesigned the battery mounts for the *Portable Sound Source* in response to numerous customer complaints of battery box breakage. While doing this, Technical Research also redesigned the sheet metal case to allow for much easier customer replacement of the batteries. Technical Research then measured and tested the newly designed parts from the vendor. Technical Research will monitor the first production run made with the new parts.

Tabletop Recorder: Technical Research updated the print User's and Care Guide for the tabletop recorder to reflect the new Nickel Metal-Hydride batteries in addition to incorporating information from other updates. New films were generated for the Vendor's production of the printed manual. The cassette master was re-recorded in the studio as well. All new tooling/information is in place for the next production run of the recorders.

Handi Cassette II Recorder: Technical Research updated the print User's and Care guide for the tabletop recorder to reflect the new Nickel Metal-Hydride batteries in addition to incorporating information from other updates. New films were generated for the vendor's production of the printed manual. Technical Research is in the process of

rewriting the script for the cassette master as well. Upon completion of the script, the master will be re-recorded in the APH studios. All new tooling information scheduled to be in place for the next production run of the recorders scheduled for mid FY 2004.

Talking Display for APH product booth: Per requests from the Educational Research and Marketing Departments, Technical Research designed and developed a portable, battery operated, programmable sign for a product display booth. This has been used in several conferences and has worked very well. The Project Leader for Adult Life will review this product, and it has the potential to be further developed into an APH product to be available for sale to the public.

Retiree's Plaque for APH Human Resources Department: Technical Research worked with the Human Resources Department to develop and procure a plaque for retiree's. The plaque is the artwork Early Braille Delivery image, laser-cut in clear acrylic. There is a solid black base that is laser cut with the employee's name, years of service, and the APH logo. The employee's name and years of service also appear on the plaque in braille and the plaque is gift boxed with two descriptive cards; one in large print, and one in braille. The first plaque was awarded to Mary Lou Monroe, a 43-year employee, at the APH Company Christmas dinner in December 2002. This plaque will be awarded to all future employees retiring with 20 or more years of service.

Presentations and Workshops

Henderson, B. W. & Wright, T.(2002, October). *Test Access: Guidelines for computer administered testing*. [Poster session], 134th Annual Meeting of the American Printing House for the Blind, Louisville, KY.

Henderson, B.W. (2003, February). *Test Access: Guidelines for computer administered testing*. [Poster Session and PowerPoint Presentation], Association of Test Publishers (ATP) conference on Technology in Testing. Amelia Island, FL.

Henderson, B.W. (2003, February). *Update on Accessible Tests Department web site*. Accessible Tests Department Council Meeting. American Printing House for the Blind, Louisville, KY.

Henderson, B.W. (2003, April). *What's Happening With Electronic Testing? An Update and Future Considerations*. [PowerPoint Presentation], Meeting of the Accessible Tests Department Core Team. American Printing House for the Blind, Louisville, KY.

Henderson, B.W., et al. (2003, June), *Modifying general assessments for visually impaired students: A primer*. [PowerPoint Presentation], at CCSSO Conference on Large-Scale Assessment, San Antonio, TX.

Henderson, B.W. (2003, July). *Update on APH projects in tests and assessments and Accessible Tests Department*. Delegation from National Institute for Visually Handicapped, Dehradun, India. APH, Louisville, KY.

Henderson, B.W. (2003, September). *Update on Computer-Based Testing*. Workshop for Test Publishers, APH Accessible Tests Department, American Printing House for the Blind, Louisville, KY.

Kitchel, E. (2002, October) *What Priorities Should APH Have When Developing Products For Secondary Sciences?* Focus session, Annual Meeting of the American Printing House for the Blind, Louisville, KY.

Kitchel, E. (2002, October) *ENVISION: A Multi-disciplinary Approach to Teaching the Uses of Optical Devices*, Indiana AER, Nashville, IN.

Kitchel, E. (2002, November) *Teaching the Student with a Visual Impairment*, Mid America Conference of Rehabilitation Teachers and Association of SouthEastern Rehabilitation Teachers, Louisville, KY.

- Kitchel, E. (2003, March) *ENVISION: A New Approach to Teaching the Uses of Optical Devices*. [All-day workshop for teachers and administrators], Indiana Deaf Blind Project, Indianapolis, IN.
- Kitchel, E. (2003, April) *ENVISION: A New Approach to Teaching the Uses of Optical Devices*, American Printing House for the Blind, Board of Directors, APH, Louisville, KY.
- Kitchel, E. (2003, May) *ENVISION: A Multi-disciplinary Approach to Teaching the Uses of Optical Devices*, Louisiana State-wide Three-day Workshop, Baton Rouge, LA.
- Kitchel, E. (2003, September) *A Few Guidelines for Making Documents and Tests More Accessible for Students with Low Vision*. Meeting of *Test Central* Core Group, American Printing House for the Blind, Louisville, KY.
- Otto, F. (2002, October). *Teaching Touch*. [Poster session] at APH Annual Meeting, Louisville, KY.
- Otto, F. (2002, November). *Tactile Learning Considerations*. Jefferson County Teachers of the Visually Impaired In-Service Training, APH, Louisville, KY.
- Otto, F. & Harrell, L., (2003, March). *Teaching Touch*. Meeting of California Transcribers and Educators of the Visually Handicapped, Burlingame, CA.
- Otto, F. (2003, March). *Tactile Graphic Products*. Vanderbilt Students In-Service Training, APH, Louisville, KY.
- Otto, F. (2003, July). *Basic Principles of Tactile Graphic Design*. In-house Braille Transcriber Trainee Workshop, APH, Louisville, KY.
- Otto, F. (2003, September). *Considerations in Test Design for Tactile Learners*. Test Developers Workshop, APH, Louisville, KY.
- Otto, F., Pester, E., & Poppe, K. (2002, November). *Learning to Perceive Through Touch: Pre-Braille and Tactile Graphics Tips for Rehabilitation Teachers*. MARCT/ASERT Conference, Louisville, KY.
- Otto, F., & Poppe, K. (2003, June). *Tools and Tips for Transcription*. Texas Focus 2003: Tactile Learning Conference. San Antonio, TX.
- Pester, E. (2002, October). *The Abacus Is Not a Dinosaur!* [Poster Session] The 134th Annual Meeting of the Ex-Officio Trustees of the American Printing House for the Blind, Louisville, KY.

- Pester, E. (2002, October). *The Big Picture: Teacher Survey on Grade 1 Braille and Grade 2 Braille*. [Poster Session] The 134th Annual Meeting of the Ex-Officio Trustees of the American Printing House for the Blind, Louisville, KY.
- Pester, E. (2002, October). *Time and Again APH Digital and Analog Clock Models*. [Poster Session] The 134th Annual Meeting of the Ex-Officio Trustees of the American Printing House for the Blind, Louisville, KY.
- Pester, E., Otto, F., & Poppe, K. (2002, November). *Learning to Perceive through Touch: Pre-Braille and Readiness*. MACRT/ASERT Conference, Louisville, KY.
- Pester, E. (2003, April). *The Abacus Is Not a Dinosaur!* [Poster Session] Kentucky AER Conference General Butler State Park, Carrollton, KY.
- Pester, E. (2003, April). *The Big Picture: Teacher Survey on Grade 1 Braille and Grade 2 Braille*. [Poster Session] Kentucky AER Conference General Butler State Park, Carrollton, KY.
- Pester, E. (2003, April). *Time and Again APH Digital and Analog Clock Models*. [Poster Session] Kentucky AER Conference at General Butler State Park, Carrollton, KY.
- Pierce, T. (2002, October). *50th Anniversary of the Research Department: Building for the Future: Multiple Disabilities*. The 134th Annual Meeting of the Ex-Officio Trustees of the American Printing House for the Blind, Louisville, KY
- Pierce, T. and Roman, C. (2002, October). *CVI Synergy*. The 134th Annual Meeting of the Ex-Officio Trustees of the American Printing House for the Blind, Louisville, KY
- Pierce, T. (2002, October). *Field Input Group: Athletics and Age-Appropriate Books*. The 134th Annual Meeting of the Ex-Officio Trustees of the American Printing House for the Blind, Louisville, KY
- Pierce, T. (2002, October). *Toy Team*. [Poster Session] The 134th Annual Meeting of the Ex-Officio Trustees of the American Printing House for the Blind, Louisville, KY
- Pierce, T. and Wright, S. (2002, November). *Time for Art*. Jefferson County Public School Teachers of the Visually Impaired In-service Training, APH, Louisville, KY
- Pierce, T. & Poppe, K. (2003, July). *PREVIEW Project*. Kentucky School for the Blind, Louisville, KY
- Pierce, T. (2003, August). *Multiple Disabilities*. Delegation from National Institute for Visually Handicapped, Dehradun, India, APH, Louisville, KY

- Pierce, T. & Poppe, K. (2002, October). *Tactile Connections: Symbols for Communication*. [Poster Session] The 134th Annual Meeting of the Ex-Officio Trustees of the American Printing House for the Blind, Louisville, KY.
- Pierce, T., & Poppe, K. (2003, July). *PREVIEW Project*. Kentucky School for the Blind, Louisville, KY.
- Poppe, K., & Carroll, J. (2003, March). *Get Aboard the Tactile Express: The Fast Track to Good Tactile Graphics*. CTEVH 44th Conference, Burlingame, CA.
- Poppe, K., & Otto, F.. (2003, February). *Tactile Considerations for Test Editing*. *Test Central* Council Meeting, APH, Louisville, KY.
- Poppe, K., & Otto, F. (2003, June). *In Touch with APH*. Texas Focus 2003: Tactile Learning Conference, San Antonio, TX.
- Poppe, K., & Kronheim, J. (2002, November). *Take A Chance...Make It Happen*. Northeast AER Regional Conference, Farmington, CT.
- Poppe, K. (2002, October). *Talking GlowDice: Case Design Survey*. [Poster Session] The 134th Annual Meeting of the Ex Officio Trustees of the American Printing House for the Blind, Louisville, KY
- Poppe, K. (2002, November). *Tactile Graphic Products*. Jefferson County Public School Teachers of the Visually Impaired In-Service Training, APH, Louisville, KY.
- Poppe, K. (2003, February). *Tactile Graphic Products: Just the Basics*. In-House Staff Training, APH, Louisville, KY.
- Poppe, K. (2003, March). *Tactile Graphic Products*. Vanderbilt In-Service Training, APH, Louisville, KY.
- Poppe, K. (2003, July). *In-House Tactile Graphic Methods and Products*. In-House Braille Transcriber Trainee Workshop, APH, Louisville, KY.
- Poppe, K. (2003, August). *Tactile Graphics: Products and Methods*. Delegation from National Institute for the Visually Handicapped, India, APH, Louisville, KY
- Skutchan, L. & Creasy, K., (2002, October) *Creating Digital Talking Books with Book Wizard*, Closing the Gap, Minneapolis, MN.
- Skutchan, L. (October, 2002). *Focus Session: Book Port*. The 134th Annual Meeting of the Ex Officio Trustees of the American Printing House for the Blind, Louisville, KY

- Skutchan, L. (October, 2002). *What APH Research is Doing in the Future with Technology*. The 134th Annual Meeting of the Ex Officio Trustees of the American Printing House for the Blind, Louisville, KY
- Skutchan, L. (November, 2002). *Overview of Technology Products and Research*. Jefferson County Public School Teacher's In Service, APH, Louisville, KY.
- Skutchan, L. (November, 2002). *Overview of Technology Activities*. Midwest Rehabilitation Teacher's Conference, APH, Louisville, KY.
- Skutchan, L. (November, 2002). *Development and Direction of Babies Count Database*. Babies Count Conference, Louisville, KY.
- Skutchan, L. (March, 2003). *New Educational Software from APH*. Presented at California State University at Northridge (CSUN) Conference, Los Angeles, CA.
- Skutchan, L. (March, 2003). *Invision the Future Conference*, Ashland, KY.
- Skutchan, L. (May, 2003). *DAISY and Book Port*. Daisy Technical Conference, Amsterdam, Netherlands.
- Terlau, M. T. (2002, October). *Orientation and Mobility Focus Group*. 134th Annual Meeting of the Ex Officio Trustees of the American Printing House for the Blind, , Louisville, KY.
- Terlau, M. T. (2002, October). *Proposed Products for Adult Life, Focus Group Session*. 134th Annual Meeting of the Ex Officio Trustees of the American Printing House for the Blind, Louisville, KY.
- Terlau, M. T. (2002, November). *"Adult life/Daily Living Projects at APH."*Mid America Conference of Rehabilitation Teachers and Association of Southeastern Rehabilitation Teachers, Louisville, KY.
- Terlau, M. T. (2002, November). *"What's New: APH Adult Life Products."*Kentucky Council of the Blind State Convention, .
- Terlau, M. T. (2003, January). *"What's New: APH Adult Life Products."*National Federation of the Blind Chapter Meeting, Louisville, KY.
- Terlau, M. T. (2003, March). *Making Better Places for Low-Vision Elders: Strategies and Resources*. The National Conference of the American Society on Aging and the National Council on the Aging, Chicago, IL.

- Terlau, M. T. & Travis, A. (2003, May). *"Independent Living Products and Strategies from the American Printing House for the Blind. The Blind Veterans Support Group, Veterans Administration Medical Center, Lexington, KY.*
- Terlau, M. T. (2003, August). *Adult Life Products and Services: What's New at APH.* [Panel] The Blinded Veterans National Convention, Myrtle Beach, SC.
- Wright, S. (2002, October). *50th Anniversary of the Research Department: Calculating the Future.* 134th Annual Meeting of the Ex-Officio Trustees of the American Printing House for the Blind, Louisville, KY
- Wright, S. (2002, November). *Time for Art.* Jefferson County Public School Teachers of the Visually Impaired In-service Training, APH, Louisville, KY
- Wright, S. (2003, March). *Update on Current Projects.* Vanderbilt students, In-Service Training, APH, Louisville, KY

Product Materials

- Kronheim, J., & Poppe, K. J. (2002) *Rolling Into Place: Author's Letter.* American Printing House for the Blind, Louisville, KY.
- Pierce, T. G. (2003). *Lots of Dots: Learning My ABC's.* American Printing House for the Blind, Louisville, KY.
- Poppe, K. J. (2003). *IntelliTactiles: Pre-Braille Concepts User's Guide.* American Printing House for the Blind, Louisville, KY.
- Poppe, K. J. (2003). *IntelliTactiles: USB Overlay Companions User's Guide.* American Printing House for the Blind, Louisville, KY.
- Poppe, K. J. (2003). *Talking GlowDice Instructions.* American Printing House for the Blind, Louisville, KY.
- Poppe, K. J. (2003). *Web Chase Game Instructions.* American Printing House for the Blind, Louisville, KY.
- Terlau, Mary T. (2002). *How to Use Your EZ Track Financial Record Keeper.* American Printing House for the Blind, Louisville, KY
- Terlau, Mary T. (2002). *Getting the most from your Braille DateBook.* American Printing House for the Blind, Louisville, KY

Publications

Henderson, B.W. (2002) *Tests Normed on Students with Visual impairment and Blindness*. Fred's Head Database Entry. American Printing House for the Blind, Louisville, KY. Posted at <http://www.aph.org/fh/index.html>.

Henderson, B.W. and Pester, E.J. (2003) *How Can I Learn Braille?: Online Resources*. Fred's Head Database entry. American Printing House for the Blind, Louisville, KY. Posted at <http://www.aph.org/fh/index.html>.

Kitchel, E. (2003) *Teen Scene: Portraits of Success*, [video], American Printing House for the Blind, Louisville, KY.

Kitchel, E. (2003) *Toys for Use with ISAVE Revised*, [multimedia], American Printing House for the Blind, Louisville, KY.

Kitchel, E. (2003) *Reading, Typography and Low Vision: A Few Guidelines for Making Documents and Tests more Accessible*, [multimedia], American Printing House for the Blind, Louisville, KY.

Kitchel, E., (2003) *Guidelines for the Production of Power Point Presentations for Audiences with Persons with Low Vision*, American Printing House for the Blind, Louisville, KY.

Kitchel, E. (2003) The MACRT Website: An Outreach Tool, *Newsletter of the Mid America Conference of Rehabilitation Teachers*, Ft. Wayne, IN.

Kitchel, E. (2003) *The Cortical Vision Impairment Protocol Revised*, [multimedia], American Printing House for the Blind, Louisville, KY.

Kitchel, E., Murphy, R. & Gevers, M., (2003) *Teaching the Student with a Visual Impairment: A Primer for the Classroom Teacher*, American Printing House for the Blind, Louisville, KY.

Kitchel, E. & Hotta, C., (2003) *ENVISION I: Vision Enhancement Program Using Distance Devices*, (Vol. I, pp. 16-117; Vol. II, pp. 16-121). American Printing House for the Blind, Louisville, KY.

Scott, K. & Kitchel, E., (2003) *ENVISION II: Vision Enhancement Program Using Near Devices*, (Vol. II, pp. 16-116; Vol. II, pp. 16-122). American Printing House for the Blind, Louisville, KY.

New Products

Accordion Folded Paper (60 sheets)	1-00086-01
Book Port	1-07440-00
Bright Line Reading Guide, Pink	1-03061-00
Bright Line Reading Guide, Yellow	1-03060-00
Color Test 2000	1-03951-00
Denver the Guide Dog, A Video	1-30010-00
Envision I: with Monocular Array	1-08551-00
Envision I: without Monocular Array	1-08553-00
Envision II: with Magnifier Array	1-08552-00
Envision II: without Magnifier Array	1-08554-00
Envision I and II Consumables Package	1-08551-01
Envision I Print Teachers Manual for Ages 10 and Under	7-08551-01
Envision I Print Teachers Manual for Ages 11 and Over	7-08551-02
Envision II Print Teachers Manual for Ages 10 and Under	7-08552-01
Envision II Print Teachers Manual for Ages 11 and Over	7-08552-02
Envision II Comic Book (5 per set)	7-08552-05
Envision II Student Activities Binder for Ages 10 and Under	7-08552-03
Envision II Student Activities Binder for Ages 11 and Over	7-08552-04
EZ Track Calendar 2004	1-07900-04
EZ Track Calendar 2004 Inserts	1-07901-04
Flat Stylus, Large Yellow	1-00121-00
Flat Stylus, Small Green	1-00122-00
Functional Vision Video	1-30009-00
ISAVE Grid	1-08540-00
JaJo Braille 2003 Calendar	1-18990-03
Patterns Library Series, Primer Level, Print Edition	8-78302-00
Picture Vision Video	1-30008-00
Pocket Viewer	1-07560-00
Pop-A-Cell	1-17002-00
Preschool Activities Calendar; Large Print/Braille	1-08121-00
Quick Braille Kit	1-00086-00
Rolling into Place of Rolling Right Along Series	1-08450-00
Slate Lightweight Aluminum 6 Line, 19 Cell & Stylus	1-00083-00
Slate Lightweight Aluminum 4 Line, 28 Cell & Stylus	1-00084-00
Slate Lightweight Aluminum 4 Line, 37 Cell & Stylus	1-00085-00
Student Starter Pack	1-00350-00
Studio Recorder	D-03600-00
Tactile Graphics Kit, redesign	1-08851-00
Tactile Graphics Large Print Guidebook	7-08851-00
Tactile Line Drawing Tools	1-08851-01
Teaching Touch, The Tactile Curriculum Kit	1-08861-00

Teaching Touch, Braille Book.....	5-08861-00
Teaching Touch, Large Type Book.....	7-08861-00
Teen Scene: Portrait of Success: DVD.....	1-30011-DVD
Teen Scene: Portrait of Success: Video.....	1-30011-00
Termite Torpedo.....	D-03470-00
The Gathering Note Card.....	W-NTCD-AF
Toss Away Ruler, Print and Braille.....	1-03010-00
Toss Away Ruler, Large Print.....	1-03011-00



AMERICAN PRINTING HOUSE
FOR THE BLIND, INC.

1839 Frankfort Avenue
Louisville, KY 40206 USA

Phone: 502-895-2405 • Toll Free: 800-223-1839

Fax: 502-899-2274

E-mail: info@aph.org • Web site: www.aph.org